April, 1958 Vol. 47 No. 4

# INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

AIAA PRECONVENTION NUMBER

# The Drawing Instruments Engineers Use and Recommend

Every year thousands of young men reach the point in their schooling where the purchase of a set of drawing instruments is required. When such young men are the sons of technically trained fathers, or when they have the benefit of guidance by any elders in engineering, it is almost certain they will insist on genuine Dietzgen Drawing Instruments. Dietzgen are the drawing instruments engineers use and recommend.

Knowing what to buy and insisting on the genuine is a matter of unusual importance in buying drawing instruments. First, drawing instruments are normally purchased but once in a lifetime. They thus become either a source of pride and satisfaction for many years . . . or a matter of unending annoyance and regret. But of even greater consequence is the fact that fine drawing instruments afford the unique opportunity to inspire men to achievement. The precision and craftsmanship in Dietzgen Drawing Instruments are both a challenge to ambition and an example of the essentials for success in engineering. This inspiration frequently proves to be the foundation for a brilliantly successful career.

Dietzgen Drawing Sets are offered in a wide range of sizes and prices to meet every need . . . featured by the better dealers everywhere.

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### Protect Your Purchase with the Dietzgen Lifetime Service Policy

Many so-called "bargain" sets of drawing instruments are orphans; their manufacturer is either out of business or not responsible for repairs or replacements. Dietzgen Drawing Instruments are protected by a Lifetime Service Policy which is enclosed with each set. This Dietzgen Policy stipulates that the instrument designs are standardized so lost or damaged parts can be replaced with perfectly fitting parts made from the same tools and with the same skill as the original parts. Further, the Dietzgen Lifetime Service Policy stipulates that adequate stocks of such parts will be maintained for the entire lifetime of any purchaser of a set of Dietzgen Drawing Instruments.

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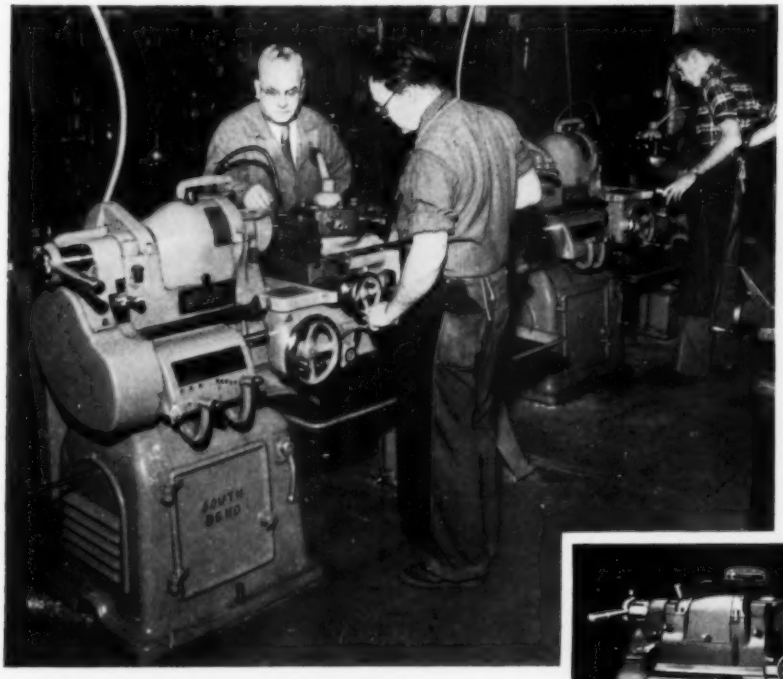


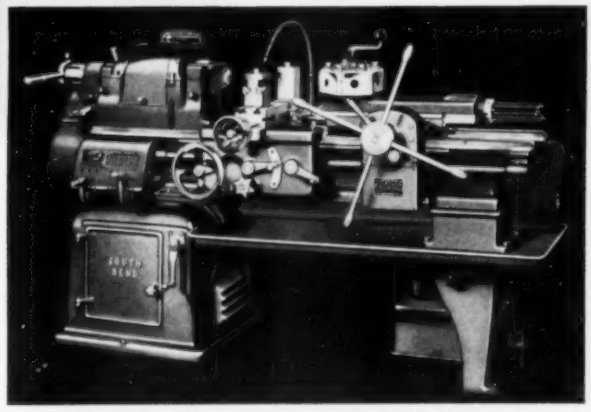
South Bend 2-H Turret Lathes, Williamsport Technical Institute, Williamsport, Pa.

# IT'S SOUTH BEND FOR PRACTICAL TURRET LATHE TRAINING

Turret lathe operation is an essential part of any well-rounded machine shop course. With South Bend Turret Lathes you can give it economically, thoroughly and with maximum utilization of equipment. They are widely used in industry and have a reputation for exacting work. You can use them with the assurance that your students are receiving practical training.

South Bend Precision Turret Lathes offer many advantages. Among them are: ease of operation—almost fool-proof design—a wider range of power turning, facing, thread cutting and turret feeds, and inexpensive tooling. Also—and this is important—they are easily and quickly converted to engine lathes. Compound rest cross slides and regular tailstocks are available to replace the double tool cross slides and the ram turrets. This permits dual usage as either turret lathes or engine lathes if desired.

South Bend Turret Lathes are made in three sizes, 2-H, 13″ and 10″. Send for free catalog giving complete information on turret lathes and other machine tools, turret attachments, accessories and teaching helps.



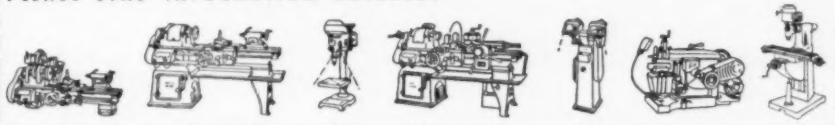
South Bend 2-H Turret Lathe as shown, less electrical and coolant equipment, and collet attachment, f.o.b. factory— **$3658**

***Project: TAP WRENCH***

The turret lathes shown above were tooled to produce stems and nuts for "T" handle tap wrenches. This wrench is one of the 34 projects fully detailed in the new South Bend Machine Shop Projects book. A sample copy of this 104 page $2 book and a copy of the new revised edition of How to Run a Lathe (total value $2.50) will be sent postpaid to shop instructors for only $1.00.

SOUTH BEND

PLEASE SEND INFORMATION CHECKED:



☐ 9″ and 10″ BENCH LATHES ☐ 10″ to 16-24″ FLOOR LATHES ☐ DRILL PRESSES ☐ ½″ & 1¼″ Collet TURRET LATHES ☐ TOOL GRINDERS ☐ 7″ BENCH SHAPERS ☐ MILLING MACHINES

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**BIG CAPACITY DELTA 20" BAND SAW** is used for big projects in the Delta-equipped Wood Shop. Delta tools are used in all three shops because at Oscar Frommel Smith (as in all schools) student safety is of prime importance.

Oscar Frommel Smith High School develops student skills and trade techniques useful in the shops and building trades at the Norfolk shipbuilding center. And according to Edward Radke, Vocational Department Chairman, "*We give students practical work on the same Delta Tools they will be using later on in industry.*" The school's most recent purchase of Delta Tools included seven new Delta 11" Metal Lathes for the Machine Shop.

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APRIL
1958

VOL. 47 NO. 4

# Industrial Arts and Vocational Education

## The Shop Teachers' Professional Magazine

**Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway, Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 233 Broadway, New York 7, N. Y.**

★ ★ ★

### This Month's Cover

The junior high school student shown on this month's cover is engaged in centrifugal casting, an intermediate step in the "lost wax" process of fabricating a jewelry project, under the direction of Dr. Ira H. Johnson, head of industrial arts education, Mankato State College, Mankato, Minn.

The photograph is by Raymond L. Johnson, instructor in audio-visual education.

★ ★ ★

### Help Crippled Children

He stands the straightest . . . who stoops to help a crippled child. Pave the way to recovery with Easter Seals.

Send your contributions to your local Easter Seal Society or to National Society for Crippled Children and Adults, Inc., 11 South LaSalle Street, Chicago 3, Ill.

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***Editorial Contributions.*** — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

## CONTENTS

Technical Co-operation ..... *A. A. Vezzani* 113

Industrial-Arts Auto Mechanics — An Integral Part of General Education ..... *John D. Ehrenborg* 119

White Cedar or Arborvitae ..... *Orville A. Oaks* 124

Editorials:

The 1958 Annual Industrial Arts Convention ..... 125

Interest Your High School Graduates to Go to College ..... 125

That Approaching Final Examination ..... 125

Helping Toward a Vocational Objective ..... 125

Shop Safety Check List for Shop Instructors ..... *C. J. Stott* 126

### Problems and Projects

Whittling Project — Bambarà Carvings ..... *Ben Hunt* 127

Aluminum Barbecue Fork ..... *Elmer B. Mattson* 130

Mounting Forging Tools Upon the Anvil Base ..... *Howard Allred* 131

Butterfly Chair ..... *Lawrence Falbo* 132

Toolmakers V Block ..... *Lawrence A. Bruno* 133

Combination Fernery, Aquarium, and Bird-Cage Hanger ..... *L. D. Jenkins* 135

A Safety Device for Lathe Switches ..... *Quentin J. King* 137

A Time-Saving Method of Jointer Adjustment ..... *Robert D. Brown* 138

Adhesives for Woodworking ..... *C. Vernon Siegner* 138

Association News ..... 6A
Personal News ..... 10A
News Notes ..... 29A
New Publications ..... 32A
Business and Personal News ..... 35A
Descriptive Material ..... 36A
Shop Equipment News ..... 38A

# PARKS PLANERS Give Your Students Practical Experience on Popular Industrial Machines

Students learning on Parks Planers benefit not only from the safe, easy, and accurate operation of these planers, but also from the practical experience of working on the same type of high-speed, precision built planers they will eventually use in their trade. The Parks No. 20, 20" Planer (at right) has a 4-knife cutter-head with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M. or 40 and 80 F. P. M. Available with knife-grinding attachment at additional cost.

THE **PARKS** No. 20
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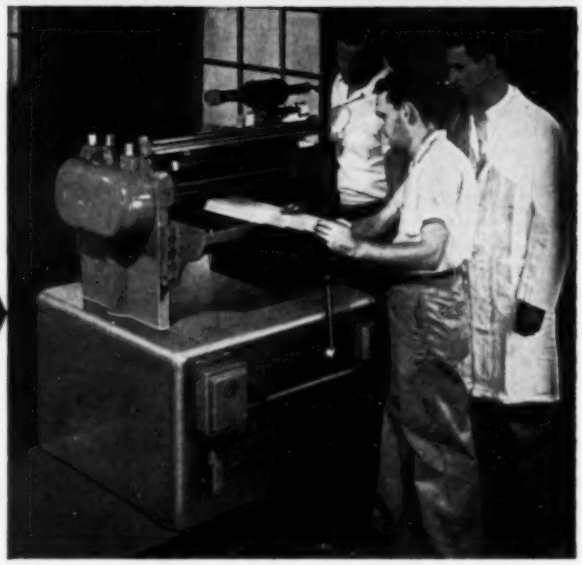
WITH KNIFE-GRINDING ATTACHMENT

THE **PARKS** HEAVY-DUTY
12" Thickness PLANER

At left is the Parks Heavy-Duty 12" x 4" Planer—a compact, sturdy thickness planer with feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/16". Both planers are priced low enough for even the most modest shop budget. WRITE FOR COMPLETE DESCRIPTIVE LITERATURE.



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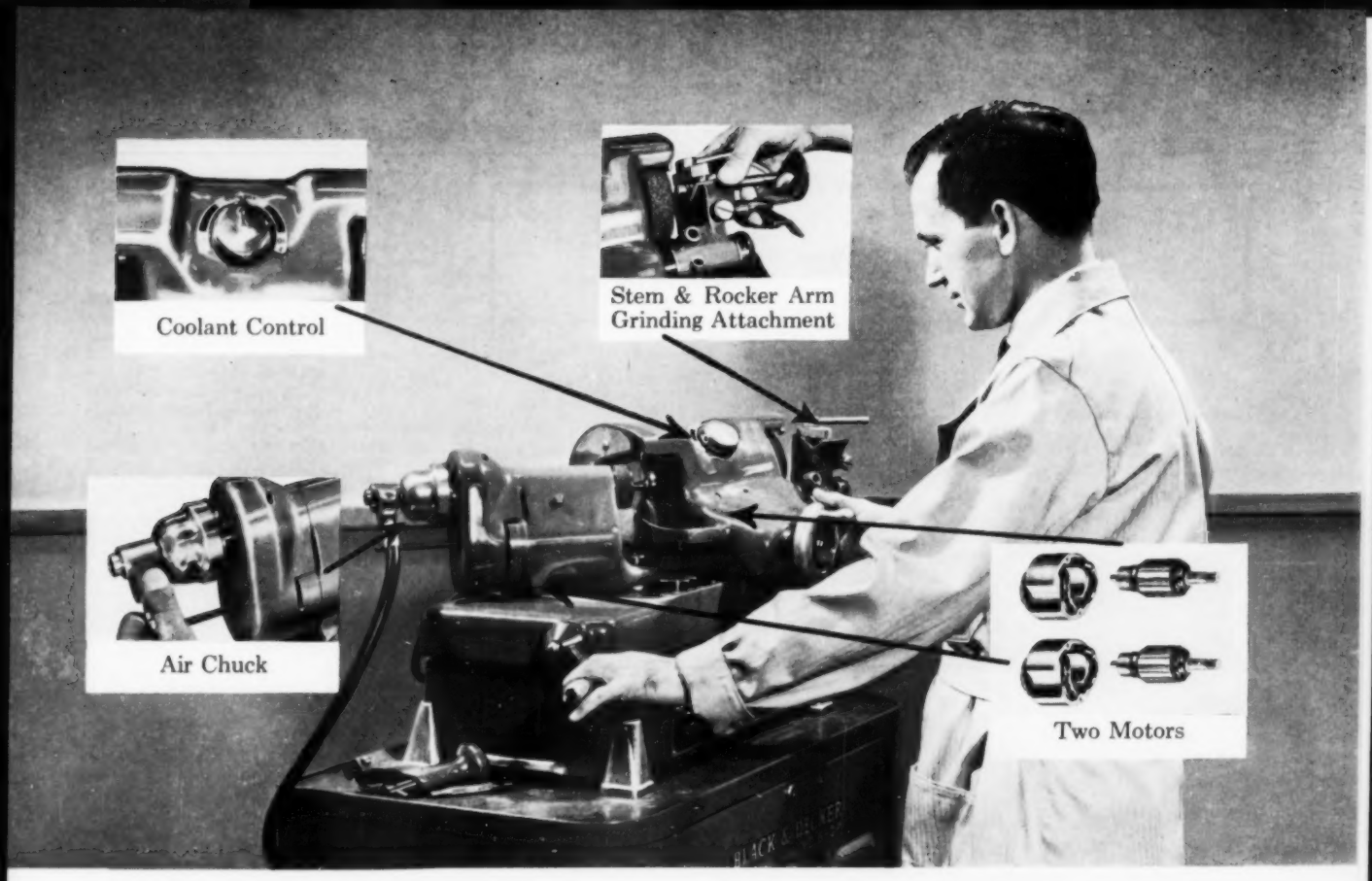


# A B&D Valve Refacer speeds learning with the tool mechanics prefer!

## Speed . . . ease of operation—two of many outstanding features!

Many instructors are taking a second look at their valve refacers and finding them out-of-date. Graduates complain they've been trained on old-fashioned machines.

So maybe it's time you looked into the Black & Decker Valve Refacer—the modern tool most mechanics prefer! Only Black & Decker brings you the super-speed air chuck with self-adjusting collet—grips and releases valve stems instantly for maximum speed—assures accurate alignment every time. Exclusive Auto-Flow Coolant Control puts exactly the right amount of coolant on the work for best operation. Two motors give you smoothest power—constant speed for top finish.

If your present refacer doesn't have these features it's earned retirement! Call your local distributor for a free demonstration. Remember, you owe it to your students to train them on the tools *in use* in the field. For additional information write: THE BLACK & DECKER MFG. CO., Dept. 4504, Towson 4, Md. (In Canada: Brockville, Ontario.)

### Check these quality features!

- ☑ Black & Decker Air Chuck with fast-acting Collet Clamp for top accuracy; top speed.
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# Association News

## COMING CONVENTIONS

*Mar. 27–28. Alabama Vocational Association,* at Birmingham, Ala. Secretary, H. R. Culver, 105 Thach Hall, Auburn, Ala.

*Mar. 27–28. Ohio Industrial Arts Association,* at Neil House Hotel, Columbus, Ohio. Secretary, C. R. Hawes, 629 Sweitzer St., Greenville, Ohio.

*Mar. 27–29. Indiana Industrial Education Association,* at Hotel Antlers, Indianapolis, Ind. Secretary, John H. Hinds, High School, Elwood, Ind.

*Apr. 4–5. Washington Industrial Arts Association,* at Western Washington College of Education, Bellingham, Wash. Gordon Nicholls, Ferndale High School, general chairman.

*Apr. 10–12. New York State Vocational and Practical Arts Association,* at Hotel Syracuse, Syracuse, N. Y. Membership secretary, Beatrice I. Hodgins, Jamaica Vocational High School, 162-02 Hillside Ave., Jamaica 32, N. Y.

*Apr. 11. Industrial Education Conference,* at Memorial Union, Ames, Iowa. President, Lowell L. Carver, 102 Building E, Iowa State College, Ames, Iowa.

*Apr. 11–12. West Virginia Vocational Association,* at Jackson's Mill, W. Va. Secretary, H. W. Calendine, Parkersburg High School, Parkersburg, W. Va.

*Apr. 17–19. Michigan Industrial Education Society,* at Civic Auditorium, Lansing, Mich. Executive secretary-treasurer, Eugene Watkins, 4029 Allen Court, Bay City, Mich.

*Apr. 18–19. Missouri Industrial Education Association,* at the University of Missouri, Columbia, Mo. Secretary-treasurer, Maurice L. Stewart, Jefferson Building, Jefferson City, Mo.

*Apr. 19. Utah Industrial Arts Association,* at Jordan School District. Secretary, Leland V. Bangerter, 1053 — 29th St., Ogden, Utah.

*Apr. 25–26. Connecticut Industrial Arts Association,* at Teachers College of Connecticut, New Britain, Conn. Secretary, George Metz, Amity Regional High School, Woodbridge, Conn.

*Apr. 29–May 2. American Industrial Arts Association,* at Hotel Statler, Boston, Mass. Secretary, Dr. Kenneth W. Brown, P.O. Box 2626, Buffalo 26, N. Y.

## OHIO INDUSTRIAL ARTS ASSOCIATION MEETING

The Ohio Industrial Arts Association will conduct their annual meeting at the Neil House, Columbus, Ohio, on Thursday and Friday, March 27 and 28, 1958.

Dr. Willis Ray, Ohio State University, will speak on "Contributions of Industrial Arts to the Education of Slow and Fast Learners" at the opening session of the convention. A discussion will follow with Howard Riegger, Central High School, Columbus; E. J. Robinson, Dayton Public Schools; and Lester Riggle, Defiance High School, as members of the panel.

On Thursday evening Dr. Lawrence Borosage of Michigan State University will speak on the subject, "Are We Putting Industry in Industrial Arts?" Following the presentation Dr. Borosage will be questioned by a panel consisting of Dr. Edward Towers, Ohio State University, Kenneth J. Herbert, Barberton City Schools, and Robert B. Boyer, Cuyahoga Heights School.

On Friday morning "Contributions to Drafting in Industry" will be treated by Harold Goodwin, West Technical High School, Cleveland. "Contributions of Industrial Arts to the Electrical Trades" will be the subject of Romeyn Bitter, of the Ephrad Engineering Company, Toledo.

The follow-up panel will consist of Menzo Stark, Wilmington College, H. M. Jellison, Akron Public Schools, and Edgar Hare of Cincinnati Public Schools.

On Friday afternoon Dewey Barich of the Ford Motor Company will discuss "The Metal Trades." Richard E. Bublitz of the J. W. Ford Company will speak on "The Printing Industry." Co-ordinating panel members will be D. Arthur Bricker, Cincinnati Public Schools, Dan J. Crowley, Bowling Green State University, and E. F. Walburn of Jefferson High School in Jefferson.

Former Superintendent of Toledo Schools, E. L. Bowsher, will be guest speaker at the banquet Friday night. His subject will be "Where Are We Going in Education."

Saturday morning will feature Andrew Paton of Kent State University, who will speak on "Automotives," and Earl Weber of Ohio University, whose subject will be "Graphic Arts for That Low Budget." Supporting panel members will be J. H. Detrick, Parma City Schools, Robert Wright, Possum

(Continued on page 8A)


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Now at amazingly low cost, you can give your students a wide variety of powerful, efficient electric tools capable of accurate work on all kinds of projects.

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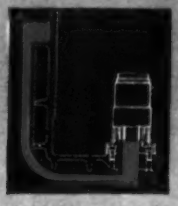
# INSIDE LOOK at the Smartest Buy in 3 to 7½ hp Milling Machines

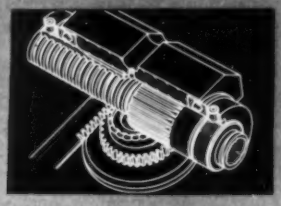
Sections of column and knee have been cut away to show interior of No. 2 MI Milling Machine, in lobby of The Cincinnati Milling Machine Co.

CINCINNATI ML and MI Millers are unquestionably a good investment for every school shop. Their versatility and general use throughout industry make them ideal machines for student training. They are rugged, safe, easy to operate. A quick look inside reveals a host of features which enable instructors to demonstrate a wide variety of setups. Five of these features are illustrated below. Of course, there are many more. Would you like to have additional information? Write for catalog No. M-1995-1.

**THE CINCINNATI MILLING MACHINE CO.**
**CINCINNATI 9, OHIO**

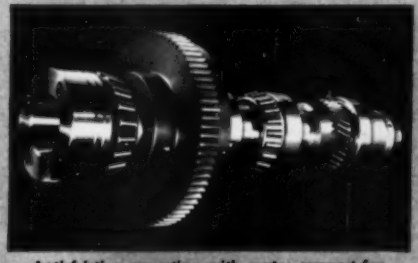


Vertical screw is submerged in a bath of oil from its own reservoir, assuring long, accurate life.

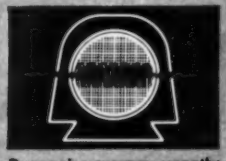


Automatic backlash device increases productivity. Machine can mill equally well as the table feeds to the right, left or alternately right and left.

Cradle type mounting for spindle drive motor.



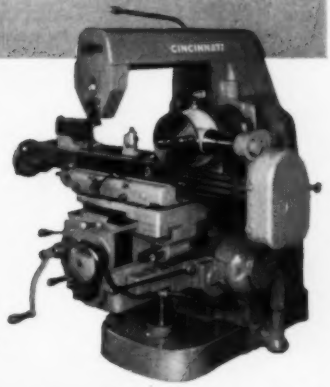
Anti-friction mounting with center support for heavy spindle assembly.



Dynapoise overarm smooths out the cutting action; provides straight-edge alignment for arbor supports.

**Brief Specs CINCINNATI ML and MI Milling Machines**

| Size | No. 2ML | | No. 2MI | | | No. 3MI | |
|---|---|---|---|---|---|---|---|
| Style | Plain | Univ. | Plain | Univ. | Vert. | Plain | Univ. |
| Longitudinal Range... | 28" | 28" | 28" | 28" | 28" | 34" | 34" |
| Sixteen Spindle Speeds | 25-1500 rpm all sizes and styles (higher and lower ranges optional) | | | | | | |
| Sixteen Feeds..... | ¼-30" per min., all sizes and styles | | | | | | |
| Motor Drive: Spindle.. | 3 hp | 3 hp | 5 hp | 5 hp | 5 hp | 7½ hp | 7½ hp |




**CINCINNATI No. 2MI Plain Milling Machine**
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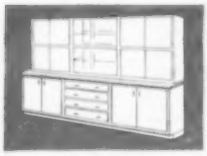

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## ASSOCIATION NEWS

(Continued from page 6A)

Junior High School, Springfield, and George Grether, North High School, Willoughby.

Joy Mohrhardt, industrial arts supervisor of Toledo is president of the association. R. O. Knight, industrial arts supervisor of Columbus is vice-president and program chairman. — *Robert B. Boyer, publicity chairman.*

### INDUSTRIAL ARTS ROUND-UP

The Industrial Arts Round-Up will be held on the Illinois State Normal University campus on April 18 and 19, 1958. This is a student project contest sponsored by the Industrial Arts Club of Illinois State Normal University, Normal Ill., and is sanctioned by the Illinois High School Association.

The events of the two-day session will include a reception and a banquet with an outstanding speaker; also demonstrations and tours, in addition to the project contests.

For further information please write to the *Roundup Committee, Industrial Arts Club, Illinois State Normal University, Normal, Ill.*

### WASHINGTON INDUSTRIAL ARTS ASSOCIATION

The Washington Industrial Arts Association will hold its Annual State Convention at the Western Washington College of Education, Bellingham, Wash., on Friday and Saturday, April 4 and 5, 1958.

Gordon Nicholls, instructor of industrial arts at Ferndale High School, is general chairman. Other convention committee chairmen are:

Programs and speakers — Dr. Pat Atteberry; publicity — Ray Chapman, Lee Otten; dinners and luncheon — Rod O'Conner; commercial displays — Jack Houser; liaison — Dr. Helper; registration — Whitfield Kratz; and photography — Dr. Ray Schwalm.

Convention activities will be highlighted with the usual Friday night banquet. School superintendents, principals, and friends of industrial arts education, wives and/or husbands are cordially invited to attend any or all sessions of the two-day meeting. Reservations for banquet tickets should be sent to Rod O'Conner, Bellingham High School, Bellingham, Wash.

Other items of interest on the agenda will include student project and commercial exhibits, demonstrations of unusual techniques, approval of state industrial arts curriculum guides, *et al.*

*— Dury A. Fox, publicity chairman.*

### ETA FIELD CHAPTER HOLDS INITIATION

The Eta Field Chapter of Epsilon Pi Tau held its annual initiation-banquet on February 14, 1958, at Tampa, Fla.

The following were initiated into the fraternity: B. H. Blankenbecler, Jake M. Brannan, Anderson G. Cusick, Manuel R. Linares, and Harry W. Walston.

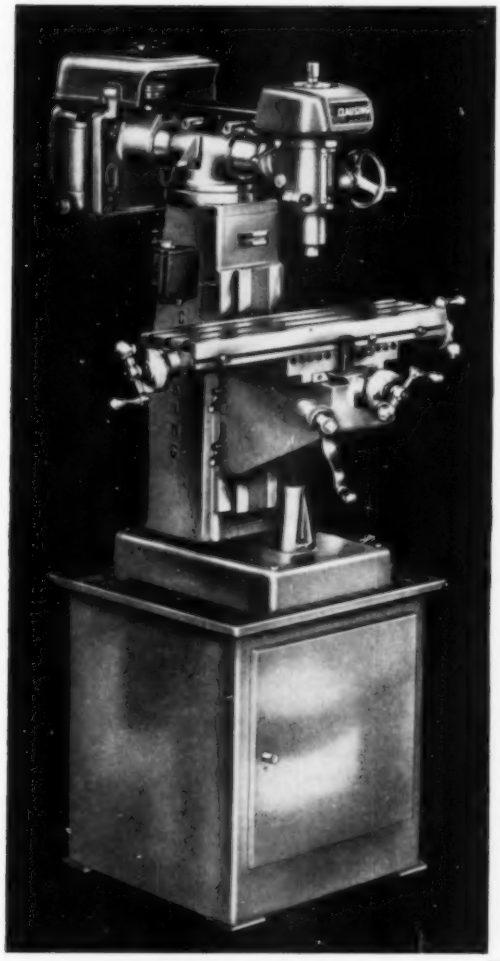
Dr. Harvey K. Meyer, professor of industrial arts, University of Florida, spoke on his experiences as Chief, University of Florida Technical Assistance Program in Nicaragua during 1955–57.

### ANNUAL INDUSTRIAL ARTS SPRING CONFERENCE

More than 1000 visitors will converge on the campus of State University Teachers College, Oswego, N. Y., May 8 and 9, 1958, for the Twentieth Annual Industrial Arts Spring Conference. The two-day session is sponsored yearly by the college, primarily for assistance to industrial arts teachers and administrators of New York State.

(Continued on page 20A)

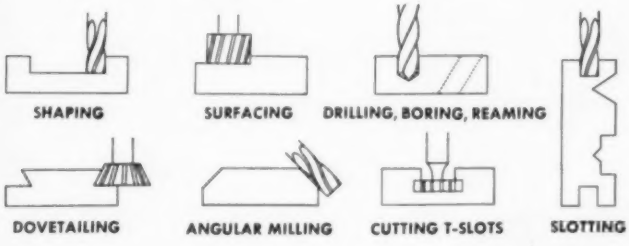
# A MILLER one of the Busiest Machines in your shop?



**YES — if it's a Clausing vertical mill!**

A student can have his work set up and a Clausing *vertical* mill ready for operation almost as quickly as if the machine were a drill press.

And look at the operations in which he can gain valuable experience with a Clausing:




Best of all, he can do *all* these operations with *one* work set-up! The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane, making it possible to mill, drill, bore, ream and shape at all angles without a single change in work setting.

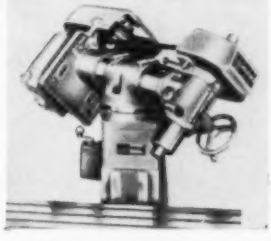
The Clausing — a machine tool widely used throughout industry — is built to rigid standards for efficient operation, sustained accuracy, and long service. For example there are 7 ball bearings in the head and drive — feed screws have ground threads, turn on ball bearings — bearing surfaces of table, saddle and knee have gibs for lasting accuracy. It has the endurance you want and need.

Investigate this versatile, multipurpose machine tool before investing in *any* mill—it's the *one* mill that can be the busiest machine in your shop! Write for free literature today.

## CONDENSED SPECIFICATIONS

| | |
|---|---|
| Size of Table | 6" x 24" |
| Longitudinal Table Travel | 15" |
| Cross Table Travel | 5" |
| Vertical Table Travel | 11⅝" |
| Max. Distance Spindle to Column | 8¾" |
| Spindle Travel | 3" |

Spindle Speeds: Six, 180 to 3250 RPM. No.7 Brown and Sharpe or No. 2 Morse Taper Spindle optional. Operates from ½ to ¾ HP, 1725 RPM motor.



The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to mill, drill, bore, ream and shape at all angles with one set-up. Quill has micrometer depth control stop and two feeds, lever and hand wheel.

The heart of the CLAUSING MILL is its rigid, high precision spindle head. It has 7 ball bearings . . . spindle is chrome nickel steel, hardened and ground . . . quill, ground and hard chrome plated, has full-length bearing seat . . . overarm is an electric furnace casting, with ¼" thick walls, precision ground.

Atlas CLAUSING DIVISION ATLAS PRESS COMPANY PRECISION MACHINE TOOLS KALAMAZOO, MICHIGAN U.S.A.

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## Personal News

### DEWEY F. BARICH RECEIVES APPOINTMENT

Appointment of Dewey F. Barich as president of Detroit Institute of Technology was announced recently by A. Frye Ayers, chairman of the DIT board of trustees.

Mr. Barich, now assistant manager of educational affairs at Ford Motor Company, will succeed DuVal J. Terpeney on May 1, 1958. Mr. Terpeney has been acting president while trustees were interviewing candidates for the presidency.

Mr. Barich, a native of Hibbing, Minn., is a veteran of 18 years in education as a university professor and administrator, secondary school teacher and state supervisor.

Dewey F. Barich

Born February 19, 1911, Mr. Barich received his early education and junior college training in Hibbing. He was awarded his bachelor of science degree in industrial education at Stout Institute, Menomonie, Wis., in 1933, and his master's degree in education at the University of Michigan in 1939. He is currently completing work for his doctorate at Wayne State University.

For nine years Mr. Barich taught industrial arts, trade and industrial education in the public schools in Flint and Trenton, Mich., and at Central Michigan College of Education, Mt. Pleasant. He also served as supervisor of trade and industrial education for the Michigan State Department of Education.

From 1942 until 1951 he was professor and head of the industrial arts department at Kent State University, Kent, Ohio. During World War II, he served as an engineering officer with the amphibious forces of the U. S. Navy.

Upon his return to the university after the war, he undertook additional duties as coordinator of veterans' affairs. More than 40,000 veterans were registered for college work under his direction.

Mr. Barich is a life member of the National Education Association. He was president of the National Association of Industrial Teacher Educators and of the Ohio Industrial Arts Association. He is a member of the National Industrial Arts Policy and Planning Committee, American Vocational Association, and served on the President's Conference on Industrial Safety.

He is currently a member of the Michigan State Board of Control for Vocational Education, and participated in the Wayne County, Mich., and the National White House Conferences on Education.

He has written numerous articles, is coauthor of three technical books, and is frequently called upon to lecture on educational subjects. His activities with Ford have taken him throughout the United States as a speaker before state and national school groups. He is listed in Leaders in American Education and Who's Who in America.

Detroit Tech has had only four presidents in its 66-year history. The Institute, with a present enrollment of 2300, consists of colleges of engineering, business administration, liberal arts and a high school department. Tech counts among its alumni some of Detroit's most outstanding business, professional, and industrial leaders.

### NEW FACULTY MEMBERS NAMED

Appointment of nine new members of the Industrial Arts Education division faculty at State University of New York Teachers College, Oswego, N. Y., has been announced by Dr. Foster S. Brown, college president.

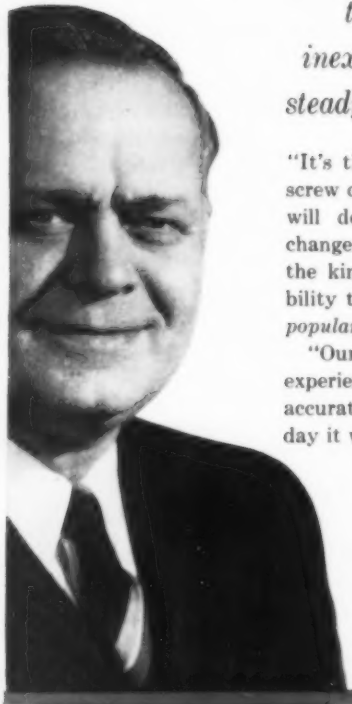
Robert J. Babcock, appointed associate professor of elementary industrial arts, is an Oswego alumnus, earning his B.S. degree in education in 1949. He holds an M.A. from New York University. He has been elementary industrial arts consultant for the past seven years in Great Neck, N. Y., schools.

Joseph Braco, supervisor of industrial arts education, holds B.S. and M.S. degrees from Oswego, and has done graduate work at Columbia University and Utica College of Syracuse University. He was formerly an industrial arts and co-operating teacher at St. Johnsville and Fort Plain Central Schools.

Robert A. Campbell, appointed assistant professor of industrial arts education, is a graduate of Gorham, Maine, State Teachers College. The holder of an M.A. degree from the University of Minnesota, he has taught at Robert W. Tripp Academy in Kittery, Me., and at Hermon High School, Bangor, Me.

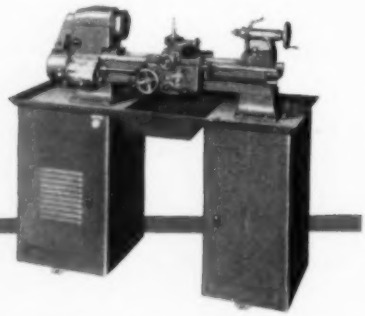
(Continued on page 20A)

"This lathe is a work horse... Teaching the intricate skills of lathe metalworking to a shop full of impetuous, inexperienced youngsters takes steady nerves and sturdy lathes.



"It's the kind of job this Logan 11" screw cutting lathe is built for. . . . It will do *more* things *well*, with no change in bearing adjustment. This is the kind of versatility and dependability that spells *low upkeep* and *high popularity* with educators!

"Our shop instructors know from experience that this Logan will be as accurate, after years of use, as the day it was set up."



Look at a Logan before you leap

Logan 11" swing lathe with 1" collet capacity, 1⅜" spindle bore, 24" and 36" centers, and 16-speed V-belt drive. . . . The Logan line includes turret and screw cutting lathes from 9" swing and 17" between centers to 14" swing and 40" between centers. Also 8" shapers.

CATALOG ON REQUEST. *Phone your* LOGAN *dealer or drop a line to:*

LOGAN ENGINEERING CO.

DEPT. D-458, 4901 Lawrence Avenue, Chicago 30, Illinois

**4-STUDENT BENCHES.** Model 1048 has 72 x 48 x 1½ in. top and 72 x 22 x 6 in. testing panel. Model 1049, illustrated above, has 72 x 48 x 1½ in. top and 72 x 7¾ x 6 in. electrical panel with cutouts for 8 standard boxes and receptacles. Both have sixteen 14 x 20 x 5 in. drawers.

# Select your electrical benches from the complete HALLOWELL line

Standard HALLOWELL benches for electrical projects range from 4-student models with drawer pedestal units to 1 and 2-student models with open bases. Any one of these sturdy, functional benches can be supplied with an electrical panel, testing panel or both, depending on individual requirements. Bases are of prime steel, phosphate coated, then finished in SPS green baked-on enamel. Working surface is famous HALLOWELL ShopTop—tough, warpfree, splinterproof laminated wood core faced with sheets of kiln-dried wood particles bonded with resins under heat and pressure.

These benches are just one group of units in the complete HALLOWELL School Shop Furniture line. See our Bulletin 2246 for all units. Write for your copy today. Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 74, Pa.

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HALLOWELL® SHOP EQUIPMENT DIVISION SPS JENKINTOWN PENNSYLVANIA

**CABINET BASE BENCHES** are available in a number of top sizes. The cabinets have sliding doors which operate smoothly on nylon rollers, are equipped with two adjustable shelves. Electrical test panel shown.

**UNIT BASE BENCHES** are regularly supplied with 2-drawer pedestal base units. Each drawer is 14 x 20 x 5 in., has flush pulls, and operates smoothly on nylon rollers. Electrical test panel shown.

**OPEN BASE BENCHES** have all-steel base consisting of two industry-proved bench leg assemblies with two integrally welded cross braces. These are joined by a ribbed stringer. Electrical panel shown.

high-quality tools by Greenlee

for accurate shopwork

The minute you take hold of a GREENLEE tool, you can "feel" the fine quality and extra craftsmanship that go into its making. All GREENLEE tools are carefully formed and finished for accuracy and correct cutting edges. All are properly heat-treated for strength and long life.

**GREENLEE 22 SOLID-CENTER AUGER BITS** bore *accurate* holes smoothly, quickly. Solid-center design gives extra strength and provides fast, positive chip clearance. Every GREENLEE 22 Auger Bit has accurately sized, perfect cutting edges that last through long use. "Plastic Sealed" to reach you factory-sharp. Available in 18 sizes: from 4/16" diameter through 2 4/16". Buy singly or in sets . . . in handy plastic rolls, steel boxes, or metal holding panels.

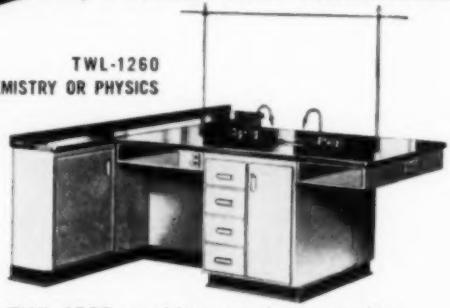
**CHISELS, GOUGES** Various types of tang butt, socket butt and firmer chisels. All are carefully balanced, easy to hold. Blades are of selected tool steel that long retains its fine-cutting edge. Green plastic handle provides comfortable, sure grip. Buy singly or in sets. GREENLEE socket gouges available with inside and outside bevels . . . same top quality as all GREENLEE tools.

TOOLS FOR CRAFTSMEN
GREENLEE

The GREENLEE tool line also includes expansive bits, electric drill bits, turning tools, drawknives, and many more. Write for literature. Greenlee Tool Co., 2024 Twelfth St., Rockford, Ill.

NEW TOLCO
4 STUDENT WALL SCIENCE TABLE

TWL-1260
FOR CHEMISTRY OR PHYSICS



The TWL-1260 combines maximum working and storage space, providing a truly efficient science center . . . adaptable to a wide variety of room layouts. Available with Tolco Carbonized or Tolstone top – both 1¼" thick.

ASK ABOUT THESE OTHER NEW TOLERTON PRODUCTS

NO. TFH-3620 COMPACT • PORTABLE-THRIFTY FUME HOOD

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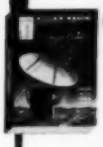
NEW knight Dual-Speed Push-Button Automatic Tape Recorder

Judged "Best Buy" among recording experts and educators. Features push-button keys for instant recording, playback, rewind, stop or fast forward operation. Renowned for faithful reproduction. Has 2-speed (7½" and 3¾" per second) dual-track recording mechanism and efficient erase system. Records up to 3 hours on a single tape. Hum-free transistorized preamplifier; quality 3-watt amplifier; 4 x 6" speaker; dual neon-glow level indicators; tone control; safety interlock to prevent accidental erasing. Simple to operate. Attractive portable case. Complete with microphone. 5" reel of tape and take-up reel. Shpg. wt., 29 lbs.
91 RZ 751 KNIGHT Recorder, only . . . . . $94.95



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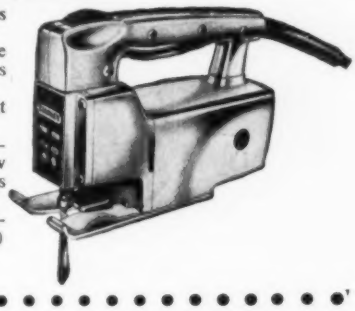
## NEW! SURFORM

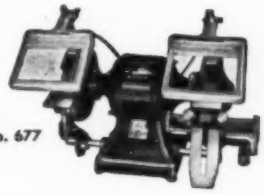
This is the amazing new tool everyone is talking about. 450 cutting edges cut wood, fibre boards, plastics, soft metals, etc. Fast, easy to use . . . both tools have same replaceable blade. Sure to be popular and useful in your school shop.

## NEW! HEAVY-DUTY SABRE SAW

- It's fast—3300 strokes a minute
- 25% longer blade life because it has 25% longer stroke
- Easy-grip handle—out of way cord
- Quick blade change—only one chuck screw
- Chip blower keeps guide line clear
- Anti-vibration mechanism (pat. app. for)



## BENCH GRINDER

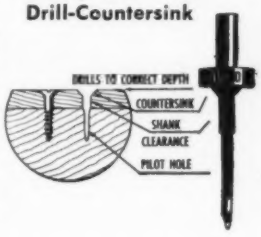



Especially designed for the school shop. The grinding attachment is for all chisels and plane irons up to 2⅝" wide. Equipped with "Flud-Lite" Eye Shields that cannot be moved to non-guarding position.

## Screw-Mate®

**Stanley No. 1525 Drill-Countersink**

This new Screw-Mate does 4 jobs at once — drills pilot hole and shank clearance, countersinks, and always stops at exactly the right screw depth. Fits chuck of hand drill, power drill or drill press. 24 sizes — from ½" x No. 5 through 2½" x No. 12. ¼" shank. Screw-Mate counterbores and plug cutters also available.




*"Boy-Proof"*

## WOOD CHISEL

*with 4½" Blade*

STANLEY No. 40—Sturdy "Boy-Proof" for trouble-free performance in school shops. One-piece alloy steel blade and shank extend almost through the handle. Tough plastic handle assembled to blade—will not come loose. Steel cap on handle transmits hammer blow directly to cutting edge of blade. Blade has excellent and uniform cutting qualities. Made in complete range of sizes. Longer blade provides extra grinding life.

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A versatile woodworking tool. Shapes edges, grooves, rabbets, mortises, inlays and templet cuts. Many woodworking jobs are easily and effectively accomplished with this multi-purpose tool. The speed of 20,000 RPM produces a surface where little sanding is necessary.

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Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

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It's fast, safe, versatile, only 4½ lbs., and built the Disston way—to last a lifetime! From its power-packed 3 amp motor to its 12 special-purpose blades and quick blade change features, the Disston D-23 Electric is designed and pre-tested to insure for you the world's finest workshop teaching tool.

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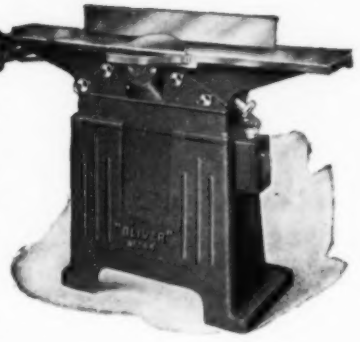
# OLIVER heavy type 8-inch Jointer is built for fine work and rugged service

This sturdy Jointer is the favorite in industry and school shops. It does excellent work, and is most convenient to operate. Takes stock up to 8" wide. Work slides smoothly over the long (60-inch) highly polished tables. Cylinder runs in self-aligning double row ball bearings. Rabbets up to ½". Fitted with new automatic knife guard for utmost safety. Write for Bulletin No. 144.



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**Modern vocational schools teach tomorrow's shopmen how to use this modern system of painting to create better working conditions.**

**Educators** in industrial and vocational schools recognize that proper use of color is contributing to the improvement of production techniques and reducing the danger of time-loss accidents.

● **That's why** more and more schools now include Pittsburgh COLOR DYNAMICS in their courses for tomorrow's shopmen.

● **COLOR DYNAMICS** is based upon the principles of the *energy in color*. Practical experience in many hundreds of plants has demonstrated that use of eye rest and focal colors on walls and machinery lessens eye fatigue and nervous tension. Morale building colors promote cheerfulness and brighten working conditions. Safety colors in danger areas reduce accident hazards.

● **Wherever these principles** have been applied, this modern system of painting has contributed to more efficient productivity. Absenteeism has been reduced because of more cheerful and pleasing surroundings. It has also been found that the relationship between employees and management has been improved.

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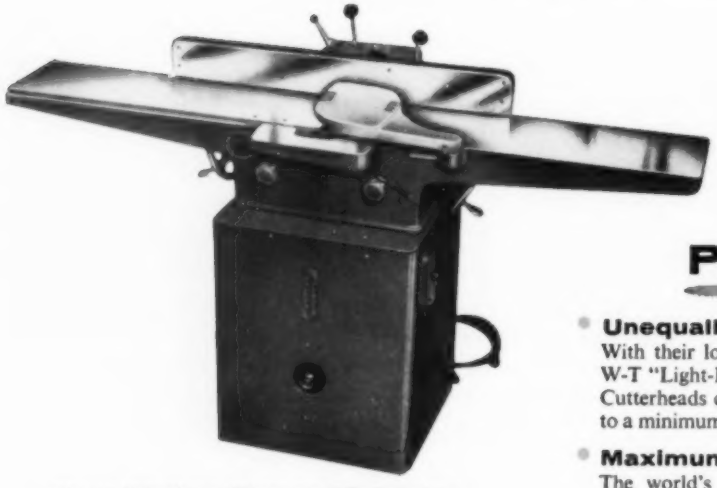

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
APRIL 1958

# Technical Cooperation

**A. A. VEZZANI***
Associate Professor of Vocational Education and Practical Arts
School of Education
University of Michigan
Ann Arbor, Mich.

"Our aim is not only to train workers to handle machinery efficiently, but to dignify the office of the mechanic — to demonstrate that one who works with machines and tools is not just a man with greasy hands and dirty coveralls, but a social being who, with training and skill, contributes to the progress of his country."

With these words, spoken by the director, another U. S. Technical Cooperation Project became a reality, as the Centro de Adiestramiento de Operadores (CAO), a school for training operators and mechanics for highway construction and farm equipment, was officially inaugurated July 28, 1955.

### Vocational Education in Mexico

It is interesting to note the motives behind the promotion of CAO because they express the attack on a problem, which parallels somewhat, the problem confronted by those interested in the promotion of vocational education in the United States before the enactment of the Smith-Hughes Act.

A study of the history of education in Mexico reveals that the major aspiration of the middle class, whenever family economics permit, is to educate their children for the professions. Many Mexican youngsters, upon completion of the primary school, start their preparation for a profession. The educational pattern followed is shown in the diagram, Figure 1. Few get into the kind of education which prepares them for employment. This tradition is further enhanced because public school funds, to a large degree, go for the support of the higher education institutions and very little is provided for the kind of education which meets the needs of the low-income groups. Vocational schools which the author has visited are old, poorly maintained, and poorly equipped. Moreover, the over-all training, judged by U. S. standards, is not comprehensive enough to adequately prepare the trainees for entrance into modern industry. Teachers in these vocational schools are not professionally trained and in many instances are employed on an hourly basis, teaching one to three hours daily. This has been the tradition for the greater part of the past century.

Realizing that to change the present thinking of those charged with the responsibility of education in Mexico would be difficult, if not impossible, the promoters of CAO hit upon the idea of an entirely new institution. Thus CAO was planned to be outside the jurisdiction of the Ministry of Education and the funds appropriated for it *earmarked* and administered through another agency of the government, the Ministry of Communications and Public Operations. Naturally, there were many logical reasons why this should be so, because roadbuilding in Mexico is the responsibility of this federal agency. Nevertheless, this truly provided the opportunity to establish a school which would not, through old traditions and beliefs, be similar to others in Mexico. This *break* enabled the development of an institution totally different in philosophy, curriculum, operation, and physical appearance, a job which could not have been done if the elements mentioned in the foregoing paragraphs had to be combated.

### The Technical Assistance Agreement

Mexico has long realized that good roads are the lifelines of a nation, along which flows an exchange of ideas and economic wealth. Mexico also realizes the importance of the use of modern construction machinery in the development of roads and therefore in the social and economic development of the country. But it is not special equipment alone that makes possible the rapid construction of modern highways, for equipment in itself is useless unless a capable force is available to operate, service, and repair the equipment.

An investigation made early in 1950 by Mexicans interested in road con-

*Professor Vezzani was on loan from the University of Michigan to the International Cooperation Administration and returned to Ann Arbor in June, 1957, after spending 30 months in Mexico.

**Preparation for Career as Engineer**

Pre-Vocational — Vocational — College (Engineering)
(3 years) (2 years) (4–6 years)

**Preparation as Technician**

Pre-Vocational — Sub-Professional — To Employment
(3 years) (2–4 years)

Primary School
(6 years)

**Preparation for the Professions**

Secondary School — Preparatory School — College
(3 years) (2 years) (4–6 yrs.)

**Trade Preparation**

Evening Trade School — Entrance into Employment
(2 years)

*Primary Schools* — similar to U. S. and teach the basic academic subjects.

*Secondary Schools* — are equivalent to grades 7–10 in the U. S. and provide only college preparatory curriculums.

*Preparatory Schools* — provide curriculums which follow the same pattern as the secondary school but of a more advanced nature.

*Pre-Vocational* — provide general education subjects and also shop experiences of an exploratory nature. Graduation enables student to enroll either in a *Vocational* or *Preparatory* school preparing him for entrance into an engineering college, or, for entrance into a *Sub-Professional* curriculum for graduation as a technician.

*Evening Trade Schools* — are the only vocational schools in Mexico. Students attend from 6–10 p.m. five evenings per week and graduate as mechanics. No formal apprenticeship program exists in Mexico at present except at CAO. Craftsmen and tradesmen employ apprentices but without agreements. Many father to son apprenticeships exist.

Fig. 1. Educational pattern in Mexico

struction revealed that, in some cases, because of lack of technical knowledge, equipment was being operated at less than 45 per cent of full capacity and that much equipment failure occurred because of improper service or adjustment. The group also discovered a deficiency of trained operators and mechanics familiar with the handling and care of highway construction equipment. From the data gathered in the study, the group recommended that training programs be developed which would supply this need for trained personnel. Technical assistance for the development of a training program of this nature was requested of the United States Government through the Point Four[1] program by the International Road Federation (Washington) and the Mexican Highway Association.

Further discussions of this idea by representatives of the International Road Federation (IRF), the Mexican Highway Association (Asociación Mexicana de Caminos, AMC), the International Cooperation Administration (ICA), and the Ministry of Communications and Public Works (Secretaría de Comunicaciones y Obras Públicas, SCOP), of the Mexican Government, culminated in an exchange of notes[2] between the Foreign Offices of the U. S. and Mexico, through which an agreement was signed setting forth the conditions for the development of a center for the training of operators and mechanics. In the agreement the Mexican Government, through SCOP allocated a budget of six hundred thousand pesos[3] ($48,000 U. S. currency)[4] as an initial subsidy for the school and donated a property consisting of an old factory building (300,000 sq. ft. under roof) with an adjoining property of 500,000 square feet for use in field practice instruction. The United States through ICA provided a grant of fifty thousand dollars to aid in the procurement of equipment and teaching aids. Under the agreement, ICA contracted with the University of Michigan for technicians to serve as consultants in the development of the project. The amount of this

[1]Now — International Cooperation Administration.
[2]April 6, 1954.
[3]One peso is equal to eight cents U. S. currency.
[4]Subsequently appropriated the same amount for 1955, an increase to this amount of 300,000 pesos in 1956, and the 1957 budget was increased to 1,200,000 pesos.

Fig. 2. The area allocated for shops, January, 1955. Fig. 3 (at right). Same area as shown in Fig. 2 during the construction of partitions to form shop areas. Note start of tool crib which is to serve two shops at left side of the picture

Upper left: Unveiling of the Centro Plaque during inauguration ceremonies on July 28, 1955. Upper right: Instruction in how to test a diesel fuel pump. Lower left: One of the five scrapers donated to the Centro being used by a student in field practice. Lower right: Student in grader operation course receiving initial instruction in grader operation

**Auto Mechanics**

| *First Period* | *Hours* | *Second Period* | *Hours* |
|---|---|---|---|
| Automotive Shop I | 2 | Automotive Shop II | 2 |
| Automotive Theory I | 1 | Automotive Theory II | 1 |
| Shop Mathematics I | 1 | Shop Mathematics II | 1 |
| Basic Shop Theory | 1 | Shop Drawing I | 1 |
| Basic Shop | 1 | Technical English I | 1 |
| *Third Period* | | *Fourth Period* | |
| Automotive Shop III | 2 | Garage | 4 |
| Automotive Theory III | 1 | Practical Physics | 1 |
| Shop Drawing II | 1 | Practical Physics | 1 |
| Welding Theory I | 3* | | |
| Welding Shop I | 2* | | |
| Technical English II | 1 | | |

**Diesel Mechanics**

| *First Period* | | *Second Period* | |
|---|---|---|---|
| Diesel Shop I | 2 | Diesel Shop II | 2 |
| Diesel Theory I | 1 | Diesel Theory II | 1 |
| Shop Mathematics I | 1 | Shop Mathematics II | 1 |
| Basic Shop | 1 | Technical English I | 1 |
| Basic Shop Theory | 1 | Shop Drawing I | 1 |
| *Third Period* | | *Fourth Period* | |
| Diesel Shop III | 2 | Diesel Shop IV | 4 |
| Diesel Theory IV | 1 | Practical Physics | 1 |
| Shop Drawing II | 1 | Personal Efficiency | 1 |
| Welding Theory I | 3* | | |
| Welding Shop I | 2* | | |
| Technical English II | 1 | | |

**Welding**

| *First Period* | | *Second Period* | |
|---|---|---|---|
| Welding Shop I | 3 | Welding Shop II | 3 |
| Welding Theory I | 1 | Welding Theory II | 1 |
| Basic Shop | 1 | Shop Drawing for Weld. | 1 |
| Basic Shop Theory | 1 | Shop Mathematics I | 1 |
| Shop Drawing for Weld. I | 1 | Practical Physics | 1 |

*Hours/week. All other figures are hours per day.

Fig. 4. Curriculums at CAO for mechanics

contract was $102,000 and covered a period of two and one-half years.

### The Work of the Technical Advisers

Of interest to teachers thinking of an assignment in a foreign country may be the mode of approach in the development of this project. True, the experiences related herewith may not apply in all cases, but they indicate what responsibilities such assignments may involve. In this instance the technical assistance given by the consultants can be classified as follows:

1. Assistance in the determination of curriculums to be offered at the Centro and the listing of the subjects included in the curriculums.

2. The development of descriptions for each subject and determination of the time to be allotted to each.

3. Assistance in planning the rehabilitation of the building to be used.

4. The planning, layout, and construction of the shop areas and classrooms, and the placement of outlets for air, water, and electricity.

5. Determination of electrical power requirements for the entire building.

6. The location, selection, and procurement of tools, equipment, classroom furniture, and teaching aids.

7. The recruitment, selection, and training of all personnel.

8. The design and development of work stations, job sheets, and related subjects instructional programs.

9. The development of all forms and student records needed for the operation of the school.

10. The development of a complete administrative organization including job descriptions.

Perhaps it is well to point out here that working in a foreign country requires certain personal qualities which may be overlooked in a stateside position, but which could spell failure on a foreign assignment. In reviewing the qualifications, on many occasions, with persons interested in the factors which make for success in this work, the points enumerated with consistent regularity were:

*a*) A good speaking knowledge of the language.

*b*) A real appreciation and understanding of the social culture of the country and the ability to live with it graciously.

*c*) A real knowledge of, with practical experience in, the jobs to be performed. (Foreign assignments are not to give neophytes experiences — the work of the consultant is to disseminate workable ideas, not untried theories.)

*d*) Possess the ability to take advantage of every sensible opportunity and medium which present themselves to publicize his program in an informative manner.

*e*) Possess the ability to write technical progress reports and articles about the project.

*f*) Be able to accept frustrations, disappointments, and seemingly poor cooperation without a display of bad temper and sarcasm.

*g*) Be able to offer suggestions diplomatically so the recipient can save face when putting the suggestions to work.

*h*) Must have patience, be co-operative, loyal, and sincere.

The writer arrived in Mexico on December 13, 1954 and after preliminary introductions commenced work on the determination of curriculums and subjects to be offered, which subsequently permitted drawing a layout for the shop areas. Figure 2 shows the space available for the shops, while Figure 3 shows the same general area during the construction of the partitions. Selection of the initial courses to be offered was done through working with an advisory group made up of road construction contractors and industrialists. This group also reviewed the tentative tool and equipment list before purchasing started. Throughout the preliminary stages close contact was maintained with these individuals to insure the establishment of a school which had their complete approval.

Most of the tools and equipment purchased for CAO are of American make and were obtained in Mexico City. During the purchasing it was interesting to note prices of U. S.-manufactured equipment as compared with the European equipment. Prices of European equipment in some cases are from 10–30 per cent lower for comparable units.

Import duties on equipment such as purchased for CAO range from 10–80

**Heavy Equipment Operators**

| *Shovel Operator* | *Hours* | *Compressor Operator* | *Hours* |
|---|---|---|---|
| Technical English I | 1 | Technical English I | 1 |
| Theory — Shovel Operation & Internal Comb. Engines | 1 | Theory — Compressor Operation & Internal Comb. Engines | 1 |
| Field Practice | 4 | Field Practice | 4 |
| *Tractor Operator* | | *Grader Operator* | |
| Technical English I | 1 | Technical English I | 1 |
| Theory — Tractor Operation & Internal Comb. Engines | 1 | Theory — Grader Operation & Internal Comb. Engines | 1 |
| Field Practice | 4 | Field Practice | 4 |
| *Roller Operator* | | *Crusher Operator* | |
| Technical English I | 1 | Technical English I | 1 |
| Theory — Roller Operation & Internal Comb. Engines | 1 | Theory — Crusher Operation & Internal Comb. Engines | 1 |
| Field Practice | 4 | Field Practice | 4 |
| *Scraper Operator* | | *Truck Operator* | |
| Technical English I | 1 | Technical English I | 1 |
| Theory — Scraper Operation & Internal Comb. Engines | 1 | Theory — Truck Operation & Internal Comb. Engines | 1 |
| Field Practice | 4 | Field Practice | 4 |

**Agricultural Equipment Operator**

| | |
|---|---|
| Technical English I | 1 |
| Theory — Agricultural Equip. Operation & Int. Comb. Eng. | 1 |
| Field Practice | 4 |

All figures are hours per day.

Fig. 5. Programs at CAO for operators of heavy equipment

per cent of the selling price. Add to this the freight and it was not unusual to find the item costing twice its selling price in the States. Through a special agreement with the Mexican Government, CAO was permitted to purchase equipment duty free. This, with the liberal discounts given by the manufacturers, made it possible to purchase at stateside prices, and in some cases at prices lower than the selling price in the U. S. An indication of the alertness of distributors, dealers, and salesmen, many of them representing U. S. firms, is the approximately 325 business cards collected by the writer from this group.

### The Curricula at CAO

The mechanics curriculums at CAO shown in Figure 4 include: auto mechanics, Diesel mechanics, and welding, while the operators programs, Figure 5, include: shovel, tractor, roller, scraper, compressor, grader, dump truck, and agricultural tractor and equipment operator. The mechanics program requires four 15-week periods for graduation, while the operators programs require one 15-week period.

The related subjects are: theory for each shop, shop mathematics, shop drawing and blueprint reading, technical English, applied physics, basic hand tools theory, and personal efficiency. The technical English courses are designed to teach how to read shop service manuals and catalogs, a majority of which are in English. The personal efficiency course covers such items as personal hygiene, how to apply for a job, how to complete a job application form, social security, union regulations, etc. This course has created much interest among school visitors.

### Teacher Selection and Training

Shop teachers at CAO must have a minimum of *twenty years in the trade* and pass a trade competency examination following the general pattern used in the States. Eyebrows may rise at the

Fig. 6. Shop area shown in Figures 2 and 3 as it appeared in April, 1957. Shop in foreground is the Auto Engine Shop. The Diesel Engine Shop is shown in the background. Fig. 7 (at right). Laboratory for aptitude and psychophysical testing of applicants. All students are given a battery of tests to insure they possess the abilities necessary for the work in which they propose to specialize

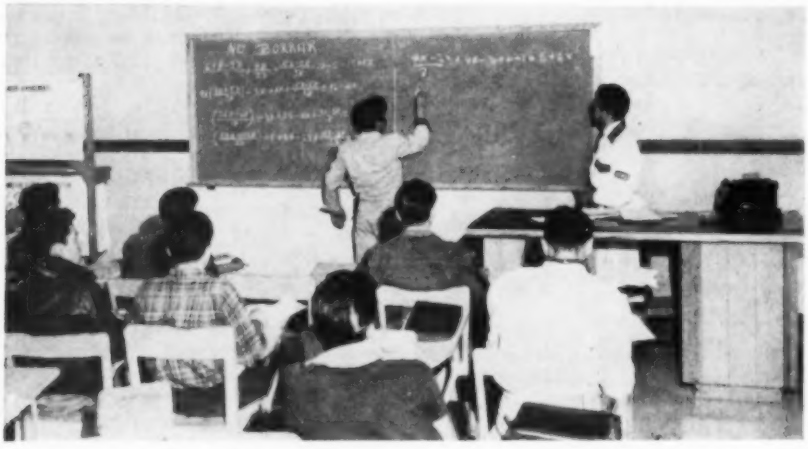

Fig. 8. Mathematics class at Centro de Adiestramiento de Operadores. Note shop coat worn by instructors

twenty-year figure, but when one considers that a youngster may start serving an apprenticeship in Mexico at the age of 10 or 12, teachers can be hired who are in their early thirties. The repair shop teachers, as well as the teachers for the operator courses, have more than the minimum requirement of experience in the trade. Needless to say, the shops look and operate as a shop should, and the work turned out of our repair shops is as good as, if not better than comparable shops in the U. S.

Related subjects teachers are either students or graduates of an engineering college or persons who have had previous teaching experience. These individuals are also selected on the basis of trade competency tests to insure a proficiency in the trade related to the subject to be taught as well as to establish their ability to serve as teachers. The problem with the engineers is to keep their instruction at a trade level rather than on an engineering level. To obtain the 26 teachers employed at the Centro, 180 individuals were given the tests.

Teachers at CAO receive from 750 to 2500 pesos monthly for six hours daily of class instruction ($60–$200 U. S. currency). Evening school teachers recieve 500 pesos ($40 U. S. currency) per month for a teaching load of six hours per week. Once a teacher has been contracted, he cannot be released without payment of three months wages as unemployment compensation.

As much emphasis in Mexican schools is placed on respect for the teacher, the result is a classroom atmosphere wherein the teacher can never be wrong. To change this tradition with the teachers at CAO, many discussions on this subject were held in the teacher training classes. It has been interesting to note the effect of these discussions on the teachers and subsequently on student attitudes. Personal interviews with some of the students indicate that a much better understanding exists between the student and the teacher and that students are beginning to discuss school problems with teachers much more easily than at any previous time in their educational experiences. A rule still exists at CAO which indicates the attitude of administration in respect to this matter. The rule permits the teacher to smoke during class, while students are prohibited. Such habits as coming to school without shaving or without a tie, as well as wearing turtle-neck sweaters, are rapidly disappearing among the staff. Occasionally a teacher reports to work who seems to have forgotten everything taught in the teacher training class, but it is satisfying to see him attempt to cover up when visitors enter the classroom. Teachers as well as office personnel must punch a time clock when they arrive and before they leave.

### The Students at CAO

Students at CAO vary in age from 16–40. In order to enroll, they must have completed the Primaria and be at least 16 years of age. All must have a health certificate, and a military training discharge card must be presented if the applicant is over 19 years of age. (Mexican youths are required by law to serve one year in the armed forces. This requirement may be met through reporting for training on Sundays from 7:00 a.m. to 1:00 p.m.)

Of the 507 students enrolled at CAO, 60 per cent have completed the Primaria (6th grade), 20 per cent the Secundaria (9th grade), 8 per cent the Pre-Vocational (11th grade), and 2 per cent are college graduates.

A majority of the students come from underprivileged families, but the middle class, as well as the upper class, are represented in the school. Most of the students, especially those from the low-income groups, seem grateful to have an opportunity to prepare themselves for Mexico's rapidly expanding construction industry. Many of these students must leave home before 7:00 a.m. in order to meet 8:00 o'clock classes, because the Centro is located 10 miles outside of Mexico City. The students, as a rule, are exceedingly polite, and it is unusual to see a staff member carrying books or packages without several students offering to relieve him of his burden. Also, it is not unusual for a group of students to applaud a teacher at the close of an excellent class session. When visitors enter a classroom, students rise and stand at attention until told to be seated. As a rule, the students have a very high mechanical aptitude, and the quality of the projects completed in the basic hand tools shop is higher than that of a comparable group in the States.

### Special Personnel Training Programs

Several two-week courses which involved stateside consultants were given at CAO. These were designed to upgrade the teaching and administrative personnel, and to make them aware of the latest techniques used in the service and repair of equipment, and in school operation and administration. Some of these consultants were supplied under the terms of the University-ICA contract, but the majority were sent by the manufacturers of equipment interested in further development of their foreign market. Among the courses of this nature offered were:

1. How to Teach Welding Shop[5]
2. Diesel Engine Theory and Adjustment[5]
3. Tire Care and Service (Goodrich Co.)
4. Theory of Lubrication (Mobiloil Co.)
5. Service Course (Briggs Stratton Co.)
6. Operation and Service Euclid Equipment (Euclid)
7. Operation and Service Int. Harvester Equipment (I. H. Co.)
8. Operation and Service Huber-Warco Equipment (H. W. Co.)
9. Operation and Service Caterpillar Equipment (Caterpillar Co.)
10. Guidance, Placement, and Follow-Up[5]
11. Principles of School Administration[5]
12. Modern Techniques in Welding[5]

[5]Contract Consultants.

### Conclusions

CAO's services are not only important to Mexico but to all of Latin America. Guatemala, Venezuela, Bolivia, Costa Rica, Nicaragua, and El Salvador have sent students to the Centro, and indications are that the number from these and other countries will increase. The importance of this service has been recognized by the Board of Directors, who in August, 1956, voted unanimously to permit 15 per cent of CAO's enrollment to be students from other Latin American countries and that the tuition for these students be the same as for Mexicans.

The idea of using the Centro for third-country training has been discussed on several occasions and seems to have possibilities. Third-country training is the training of country personnel from other ICA missions. Normally, these trainees are sent to the States, but in cases where the trainees cannot speak or understand English, sending them to CAO would take care of the language difficulty and also be more economical.

The Centro does not profess to graduate experienced mechanics or operators, but rather individuals who have been exposed to the required knowledges and experiences which are necessary for entrance into, and good performance on the job. To enable the Centro to graduate mechanics with job experience, an experimental road camp is now under consideration. This camp, should it materialize, will employ and pay the graduates for their services in the actual construction of roads. This on-the-job experience for a period of six months should aid materially in attaining the goal of graduating mechanics and operators with a background of practical experience. Though the co-operative education idea for attaining the same goals was suggested, it was considered the road camp would better serve the purpose.

As of May, 1957, the Centro has graduated 116 students. Of this group 37 returned to positions in their home town, 14 have gone into private business, and the remainder are employed in shops in Mexico City.

It is possible that there are those among the readers who question the value of our Foreign Aid program and the right of a government to take money from its citizens and pour it into a foreign country. In the two and one-half years on this job, the writer has attempted to analyze this policy objectively, and though far from an authority on the subject, can quote from his experiences. It is true, as in many organizations, that there are those who, in the administration of Foreign Aid programs, lack what is generally considered good judgment in the use of the taxpayers' funds. But there are other cases where excellent judgment has been used, and the results have been beneficial to the U. S. foreign policy. Perhaps the biggest problem confronting the program lies in the recruitment of capable personnel. But what organization does not have this problem? Employers are continually after educators about the development of persons with proper attitudes and abilities.

CAO has in a small way, and at a low cost to the U. S., done much to further the objectives for which ICA was created. It has provided a vehicle around which even better understanding between Mexico and the United States can grow. Mexico is our neighbor, and Mexico is growing stronger by the year. One objective of our foreign policy is to develop strong, understanding neighbors. CAO is helping to attain this goal.

Certainly U. S. manufacturers have benefited and will further benefit from the establishment of CAO. Their interest is shown through the special courses they have offered and through the donation of equipment which is valued at well over $100,000. Competition for foreign markets is becoming more acute and an important factor which will aid the vender of the future is the ability to provide trained mechanics to service the equipment. Ability to supply the correct repair part and efficient service is already a large factor considered by purchasers.

The feeling of ICA personnel about the Centro can be obtained from the following quotation taken from an Unclassified Report, ICA/Mexico to ICA/Washington.[6] "By all standards, the Center may be rated as a going success. At the present time there are courses in automobile, Diesel, welding, and the operation and maintenance of agricultural and heavy equipment. The total number of students attending the Center averages about 400.[7] Both day and night classes are given. The program is economically sound, has impact, is widely publicized, and receives complete Mexican support."

In conclusion, Foreign Aid, through Technical Assistance, is at its best when it provides an educational medium which effectively reaches the underprivileged of a country, upgrades them through the educational process to better understand, to improve their way of life, and to add, through technical know-how, to the social betterment and welfare of their country. Such a medium is the Centro de Adiestramiento de Operadores.

[6] TOICA A-193, p. 2, dated 9/20/56.
[7] Enrollment May 1957, 600 students.

# Industrial-Arts Auto Mechanics—An Integral Part of General Education

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Successful teaching in the field of industrial-arts auto mechanics is considered by some to be a difficult task. This need not be the case. I should like to propose that the ingredients of success are as follows: (1) an adequate philosophy of industrial-arts auto mechanics; (2) an organized plan or course of study; and (3) an appropriate physical setting in which to carry out the objectives of the philosophy.

### An Adequate Philosophy

Let us consider the first point in our criteria — an adequate philosophy. The importance of a goal cannot be disregarded. We must have direction if we are to maintain an adequate standard of teaching. Industrial arts is an integral and contributing part of the total educational program. It contributes to the intellectual development, social

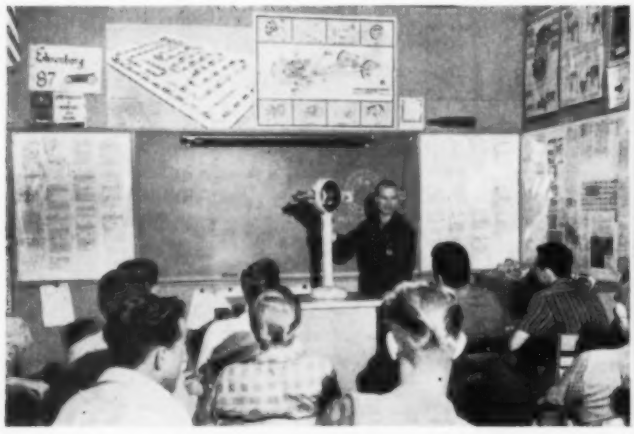

Fig. 1. A typical weekly classroom theory session covering the operation of differentials. Fig. 2 (at right) Students working co-operatively under the "Buddy System"

orientation, economic adjustment, and civic responsibility of the student. Industrial-arts auto mechanics fulfills these requirements which are a necessary part of general education.

The concept of beginning auto mechanics in the San Diego Unified School District is that the course is designed for the automobile owner driver. The student learns what minor adjustments to the car he can make himself, and recognizes a job that requires an expert mechanic. The student acquires a basic knowledge of the California Vehicle Code, and develops an appreciation of the importance of driving safely at all times. He learns to identify and understand the function of the various mechanical units in the automobile and develops basic skills required in automotive repair work. He gains a knowledge of the requirements and opportunities in the automobile manufacturing and service industry.

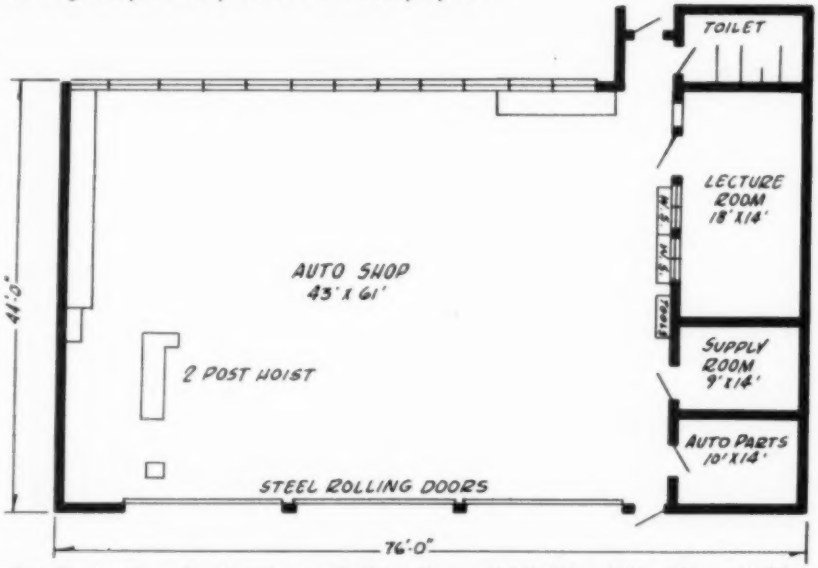


Fig. 3. Auto mechanics shop at Herbert Hoover High School, San Diego, Calif.

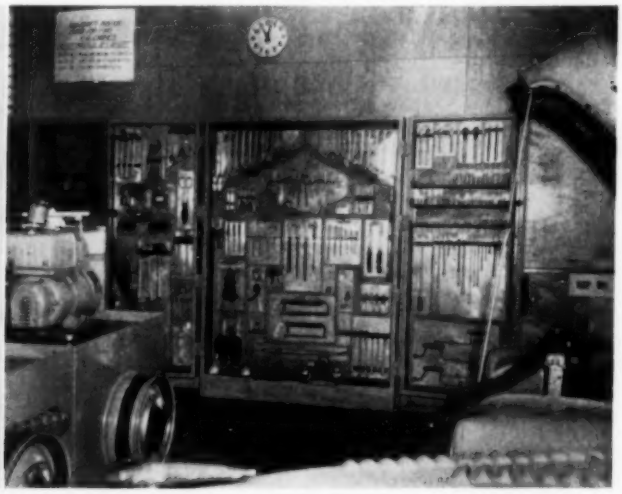

Fig. 4. The parking area and front view of the Hoover High School automechanics shop. Fig. 5 (at right). An open tool panel in a central location provides accessibility of tools

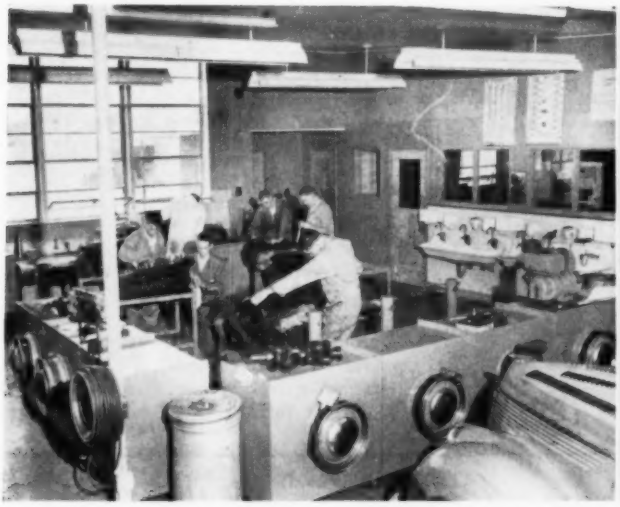

Fig. 7. The machine area used for engine overhaul. Fig. 6. (at right). Tool placement on open tool panels which are classified by types of tools

It has been found that these requirements can be successfully fulfilled in a 55 minute program. The advantages of the 55 minute program are readily apparent.

1. The students are able to program auto mechanics into their regular schedule without hindering other subjects.
2. More students are able to enroll in the auto-mechanics classes.
3. The master program becomes simplified and versatile.

### An Organized Plan of Procedure

An organized course of instruction is necessary to the 55 minute program. This brings us to the second point in our criteria . . . the need for an organized plan of procedure. The writer has tried both the *live car repair* and the laboratory type of instruction. Both have been found lacking in certain respects. It has been found that a compromise is needed between these two methods of instruction if the objectives of the course are to be fulfilled. If the student is to develop to his fullest capacity, some method or procedure must be used to assure full coverage of the subject matter by all students. At the same time it is important not to lose sight of the *natural* interest the student holds for the automobile.

The following steps will need to be taken to assure coverage of the subject matter.

1. Students will have to be required to complete certain operations during the year.
2. These operations should be done preferably on a live car.
3. If a live car is not available, the instructor must be able to provide a

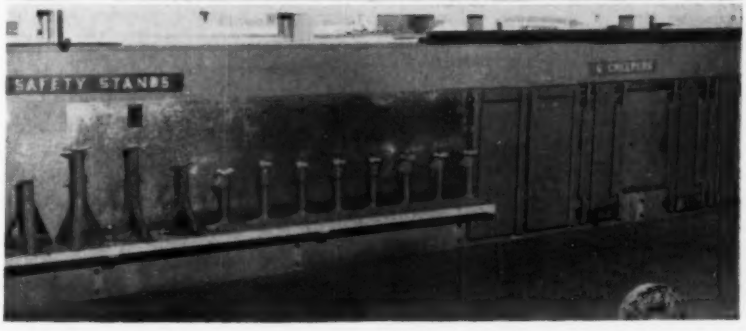


Fig. 9. A modern two-post hoist that enables the students to work on the underside of the car without interference. Fig. 10 (lower). Orderly storage of equipment in a convenient location

— San Diego City Schools Photos

working model for the completion of the job.

4. A buddy system should be developed to promote group co-operation.
5. Project sheets will need to be developed to aid the instructor in the program.
6. These classes will have to be limited to a maximum of 25 students.
7. A portion of the shop time must be devoted to related information, demonstrations, and automotive theory.

The following methods have been used by the writer to assure coverage of the above statements. The class meets five days a week for 55 minute periods. The course is designed to cover one school year. One day a week is devoted to related information and automotive theory. Figure 1 is representative of such a classroom session. Group demonstrations are given frequently and as the need arises. Each student is required to complete by the end of the year the following list of operations.

1. Remove and replace a cylinder head.
2. Remove and replace an oil pan.
3. Remove and replace an intake manifold.
4. Remove and replace an exhaust manifold.
5. Remove and replace an L type valve.
6. Remove and replace an L type valve spring.
7. Remove and replace an I type valve.
8. Grind a valve.
9. Grind a valve seat.
10. Lap a valve.
11. Adjust an L type valve.
12. Adjust an I type valve.
13. Adjust an early Ford valve.
14. Overhaul a hydraulic lifter.
15. Remove and replace a connecting rod bearing.
16. Remove and replace a main bearing.
17. Make a crankshaft.
18. Take a compression test.
19. Remove and replace a piston.
20. Remove and replace piston rings.
21. Ridgeream and hone a cylinder.
22. Clean and gap a spark plug.
23. Clean battery terminals and test battery.
24. Adjust ignition points.
25. Set ignition timing with a timing light.
26. Time a camshaft to a crankshaft.
27. Remove and replace a water pump.
28. Remove and replace a thermostat.
29. Adjust a fan belt.
30. Remove and replace a fuel pump.
31. Test a fuel pump.
32. Vacuum test and adjust a carburetor.
33. Time a distributor to the camshaft.
34. Adjust an internal parking brake.
35. Adjust an external parking brake.
36. Adjust Huck brakes.
37. Adjust Bendix brakes.
38. Adjust Lockheed brakes.
39. Bleed the hydraulic system.
40. Adjust the clutch.
41. Remove and replace the clutch.
42. Remove and replace an internal type axle.
43. Remove and replace an external type axle.
44. Remove and replace a bolt-on type brake drum.
45. Remove and replace a key and taper type brake drum.
46. Adjust the steering gear.
47. Lubricate a car.
48. Pack the front wheel bearings.
49. Grease the speedometer cable.
50. Cross switch the tires.
51. Remove and replace a tire from a rim and repair a tube.
52. Change oil.
53. Service an oil breather.
54. Service an air cleaner.
55. Wash an automobile.
56. Remove a minor dent.
57. Arc weld.
58. Acetylene weld.
59. Braze
60. Use a cutting torch.
61. Overhaul a carburetor.
62. Remove and replace the brushes on a generator.
63. Remove and replace the brushes on a starter motor.
64. Overhaul a transmission.
65. Overhaul a differential.
66. Overhaul a master brake cylinder.
67. Overhaul a brake wheel cylinder.

In order to help the students learn the correct procedure for the various operations, the writer has developed project sheets for each of the jobs. These project sheets have been duplicated so that each student has in a notebook a complete set. This enables the student to refer to the project sheets as he is

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**LESSON SHEET**

**Set Ignition Timing With a Timing Light**

Student _____ Approved _____
Date Started _____ Date Finished _____
Make _____ Year _____

**Ignition Timing**

Modern engines are equipped with timing marks. These allow the mechanic to adjust the engine timing with a strobe light while the engine is running. Engines are constructed to fire in the T.D.C. position of the position at low R.P.M. If the engine can be adjusted to fire at T.D.C. No. 1 cylinder, then it follows that all the cylinders will fire in that position. The manufacturer, therefore, marks either the front pulley or the flywheel with a T.D.C. mark and a pointer. Thus, when No. 1 piston is T.D.C., the mark is opposite the pointer. With this arrangement, if we fasten a light to No. 1 spark plug, so that the light shines whenever No. 1 fires, we can see if the mark is opposite the pointer. If it is not, we can adjust the distributor until the spark occurs at the correct moment.

Read: Motor Manual, "Ignition Timing" under engine involved. Heitner, pages 256–259, 268–269.

Tools and Equipment Needed:
Timing Light — Chalk
Box-Open End Wrenches

To Adjust Ignition Timing:

1. Get the manufacturer's specifications for the ignition timing.
2. Locate the ignition timing marks on the engine flywheel or front pulley.
3. Clean the area around the timing mark. Mark it with chalk.
4. Idle the engine down to the specifications and hook up timing light — 2 yellow leads across battery, red lead to No. 1 cylinder.
5. Direct the timing light toward the timing mark. If the timing is correct, the timing light flash will coincide with the appearance of the timing mark on the pointer. If the timing is incorrect, the distributor hold down clamp will have to be loosened and the timing adjusted.
6. Move the distributor until the timing is correct, and tighten the hold down clamp.
7. Speed up the engine with the light shining on the mark. Note if the mark advances (away from the pointer).
8. This checks the vacuum advance mechanism. If it does not advance the mark, check with the instructor.

Questions:

1. Your timing mark was located on the .....
2. You can tell if the vacuum advance is working by watching the timing mark ..... when ..... the engine.
3. Where was No. 1 spark plug on your car? .....
4. According to the Motor Manual the correct timing was .....

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working and gives him a permanent file of basic manipulations associated with automobile repair. If financing prevents the instructor from duplicating the project sheets, one set can be typed and placed in a convenient location. The students can then be given small composition books for answering questions and for jotting down notes about the operations. An example of such a project sheet is given herewith.

The students work on these projects in the order that is meaningful to them, i.e., if a student needs a valve job on his automobile, he works on the series of valve operations. The buddy system is used in the shop program — each boy chooses his own partner. Figure 2 illustrates two boys completing the operation of timing an engine with a timing light. The procedure that these boys would follow in the completion of this project is as follows.

Students *A* and *B* working co-operatively decide to complete the project "*set ignition timing with a timing light.*"

Student *A* has parked his car in the auto shop area that morning for this purpose. Student *A* drives his car into one of the shop stalls. The students then read over the instructions on the project sheet. They are somewhat acquainted with the job in that it was demonstrated to them by the instructor at an earlier date. After reading the procedure, the students obtain the tools listed as needed and prepare to complete the operation. The project procedure is followed as they complete the work. Upon finishing the timing of the engine, the instructor is called for approval of the work. The students then return the car to the parking lot and read the references listed on the project sheet. After reading the necessary information about the job, the students answer the questions on the project sheet and check with the instructor for final approval.

This procedure is followed for each job. The instructor keeps a project card on each student in order to follow the student's progress. By using this system of project sheets, the instructor is relieved of many problems and can devote his full time to the instruction of students needing help with their work.

This system of required projects has proved to be very successful. The students have benefited by complete coverage of the material necessary to a basic course. At the same time a high interest factor is maintained because the work is completed on the students' own automobiles or those of his friends. There is sufficient time in the course for the students to complete additional work on their cars. An average student will have approximately one quarter of the year in which to complete this additional work. This gives the students further satisfaction.

### The Physical Setting

The third and last criterion to a successful auto mechanics program is an appropriate physical setting. The San Diego Unified School District has designed a modern, well-equipped building for this purpose. Figure 3 represents a floor plan of the shop building.

The shop building is located away from the main school plant so as not to disturb the academic program. There is a large fenced parking area outside the shop in which the students may park their cars. A portion of this area can be seen in Figure 4. This area eliminates any need for the students to leave the school grounds to pick up a car. A separate classroom is essential to this program for the weekly classroom work. Figure 1 illustrates a typical classroom session.

The keynote of success in any shop is the organization of the equipment. The writer has found that tools and equipment can be successfully left open so that students may use the tools when needed. However, an important axiom to this method is *A place for everything and everything in its place.* It has been found that the more equipment and supplies that can be open to the students, the more time the instructor has for instruction. Students tend to feel that the shop is their responsibility when everything is left open for their use. Figures 5 and 6 indicate the organization of some of the open tool panels. The main panel is equipped with all the general types of tools. The individual tool panels are located in the area where the tools are used most often and are grouped according to type. Open tool panels can be successful if properly constructed. The following items will need to be considered in their planning.

1. Durable, colorful metal holders which may be easily cleaned must be constructed.
2. Every tool holder must be marked by name to insure proper tool placement.
3. Careful instructions need to be given to train the students in orderly tool care habits.

In the San Diego Unified School District color dynamic systems are used to enrich the appearance of the shops, and to introduce the student to industrial type surroundings. A stock room is located on the south wall of the shop next to the auto parts room. Supplies are kept in the stock room which also serves the dual purpose of an office for the instructor. The auto parts room is used for storing large parts that will not fit into the students' lockers.

The area that is sectioned off by the lockers in Figure 7 is the machine and engine overhaul area. This area is used for the repair of engines and other parts that need overhauling. The northeast corner is designated for shop engines. These engines are used by students who do not have live cars on which to complete the projects. In Figure 8[1] the instructor is demonstrating an operation on a laboratory engine. A two-post hoist is located in the northwest corner which is considered the lubrication and welding area. This area can be seen in Figure 9. A wash rack where parts and cars may be cleaned is located outside the shop. A bench is located in this area so that the auto parts can be cleaned before bringing them into the machine area for repair.

Figure 10 depicts the type of shop organization necessary to a smooth operating program. Equipment such as creepers and safety stands have to be stored neatly and conveniently. Figure 7 points to a method of storing air hoses and extension cords. Attention to organizational details of this nature are an integral part of a student centered program. The students must feel that the shop is their responsibility, and must want to keep equipment neat and orderly for efficient use. If maximum effort is devoted to proper organization of tools and equipment, minimum effort will be exerted in maintaining the shop.

We have discussed three major factors necessary to a productive industrial arts auto mechanics program — (1) philosophy, (2) course of study, and (3) physical setting. In the San Diego Unified School District attempts to meet these criteria have proved successful. It is hoped that this success will meet the needs of many other teachers.

[1]Figure 8 may be seen by referring to the photograph on the cover of the March, 1958, issue of this magazine.

Photographs credited to the San Diego City Schools.

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B. A. Precourt, safety director, AAA Wisconsin Division, Madison, Wis., says:

"Many parents warn their children to look both ways before crossing the street, but they seldom teach the necessity of looking back over the shoulder to check for cars making turns."

He adds that one of the best ways a parent can impress this lesson on a child is to take the child out to a street corner and show how it should be done. "And after showing a child," Precourt continues, "parents should continue to set a good example by always watching for turning cars themselves — it might save their own lives one day."

# White Cedar or Arborvitae

**ORVILLE A. OAKS**
Wilmette, Ill.

The American Indian often refers to the White Cedar (Thuja occidentalis) of the Pine family, as Oo-soo-ha-tah, or "Feather-leaf." It is the second most sacred tree of the Ojibwe or Chippewa, the Forest Potawatomi and the Fox, as well as other Algonquian tribes of Canada, Minnesota, and Wisconsin. The universal usefulness of the Oo-soo-ha-tah plus its close connection with Winabojo — Longfellow's Hiawatha — their mythical and cultural hero who wore it on his head as an ornament because of its beauty, made it a tree to reverence and to offer sacrifice.

Their sacrifice, the offering of tobacco when gathering sacred White Cedar bark or wood varies among the different tribes. In general, however, among the Ojibwe and Forest Potawatomi, a venerable man speaking for the group, expresses gratitude to the spirit of the trees and of the woods, asking permission to collect the wood or bark, and protection and strength for the task. Without this protection someone may cut a tree carelessly and be hurt by its fall. The protection and good will of the thunderbirds is also asked, as they live in the tops of the tallest Oo-soo-ha-tah's and may become angry over the felling of their special trees. Tobacco is offered to Winabojo, to the cardinal points, to the sky and grandmother earth, with properly murmured petitions. He then places the tobacco in a hole at the foot of the particular Oo-soo-ha-tah to be felled. The same murmured petitions are repeated while a pipe is filled and offered as was the tobacco. As he lights and smokes his pipe, tobacco is passed around for all present to smoke. The Chippewa end this simple ceremony with a feast before proceeding to cut the chosen arborvitae trees.

Among the Ojibwe and Forest Potawatomi the pungent fragrance of the leaves and the wood is always acceptable incense to Winabojo. During their medicine-lodge ceremonies a smudge is made by throwing leaves on a pan of live coals from the sacred fire. Their sacred objects as well as the hands and bodies of participants are then purified with this fragrant smoke. The Potawatomi further feel the pleasant smoke from the smudge drives away the spirits which retard recovery of the sick. The Fox use these leaves for smoking their sacred pack as their Manitou loves the spicy smell of the arborvitae best of all. They also burn them in their doorways to drive away the "big soul" — soul of the dead which has come back to steal the soul of the living. At the time of the Jesuits leaves and twigs were placed in the beds of the Indians to keep snakes away.

The Oo-soo-ha-tah is found in Canada from Nova Scotia and New Brunswick to the Lake States, and in the Atlantic region to New Jersey, south in the Alleghenies of Virginia, North Carolina, and Tennessee. It is usually a lover of swampy places, where it often grows in dense pure stands, normally 50 to 60 feet tall, rarely 75 feet, with an occasional diameter of 6 ft. This slow growing *tree of life* — another local name — although often hollow in old age, lives to be 250 to 300 years old. The light brown heartwood is very soft, but durable, with a fine uniform texture. The northern Indians made their canoe frames and ribs of this lightweight straight-grained wood by pounding it with a stone maul until separated along the annual rings into thin slats — today they use an ax. In the old days the dried outer bark furnished them tinder for their fire by friction, and the tough inner bark made their fiber bags. Today it is still rolled into torches for night hunting. The leaves today serve them as tea for headaches, medicine for coughs and chest colds, and as a seasoner for other unpleasant compounds. Even our own pharmacology use the leaf oil internally, much as the Indians did, for coughs, colds, fevers, catarrh, rheumatism, and in the removal of intestinal worms. Externally it has been applied as an ointment in the treatment of ulcers, warts, and cancerous growths. Commercially, at one time, arborvitae hand-rived shingles were used in Maine as legal tender by grocers and traders. Today, although getting scarce, due to its great durability the wood is in demand for round fence posts, telephone poles, cross-ties, shingles, fish-net floats, imitation minnows for fishermen, buckets, tanks, stave cooperage, and locally for canoe frames and small boats. My favorite samples of this pungent wood, cut in 1933 from a stump at the summer home of Glen Kelly, Little Manistique Lake, Upper Michigan, give proof of this durability. The stump as well as the tree top was a survival from the swamp logging days of around 1860. Horticultural forms of the Oo-soo-ha-tah, in many varieties, are in great demand for ornamental plantings.

In October of 1945 I visited the magnificent group of *trees of life*, growing by the waters edge along Cedar Creek, Natural Bridge, Virginia, claimed by some to be the oldest trees in the South next to the cypresses. As I stood admiring the largest of the group, 15 feet in circumference and soaring 90 feet in the air, I could readily see why the *tree of life*, which actually gave life to the Ojibwe, Forest Potawatomi, Fox, and other Algonquians, was sacred to them.

## STEEL PIPELINE TRANSPORTS SOLID SUBSTANCE 72 MILES

The use of steel pipelines to transport solid substances gained a new application recently.

Gilsonite, a natural asphalt-like substance, used to make gasoline and coke, is now being pumped through a six-inch steel pipeline over 72 miles of rugged, uninhabited mountain terrain in Utah and Colorado. The line spans two large canyons — one 700 feet and the other 600 feet long — and climbs over an 8500-foot mountain pass.

The gilsonite is crushed and mixed with water. This slurry is kept under constant agitation and sent through the pipeline at the rate of 325 gallons per minute.

Another steel pipeline is transporting coal for a distance of 108 miles in Ohio. This operation was described briefly in *Steel Facts* No. 143. — *Steel Facts.*

# Industrial Arts and Vocational Education

JOHN J. METZ, Editor

## THE 1958 ANNUAL INDUSTRIAL ARTS CONVENTION

THE American Industrial Arts Association convention this year will be held at the Hotel Statler, Boston, Mass., April 29–May 2. At the same time the American Council on Industrial Arts Teacher Education will hold its annual meeting to discuss its problems and its yearbook program.

The American Council of Industrial Arts Supervisors also will hold their meeting, and both of the above affiliates will join the American Industrial Arts Association in planning how to improve the industrial-arts courses offered in the schools of our country.

The best advice for industrial-arts teachers and others engaged in industrial arts and vocational education work is to make every effort they can to attend the American Industrial Arts Association convention this year and in the years ahead. Besides meeting friends that one may not have seen for years, there are numerous speakers who are usually the top men in their fields, men who have had years of experience in teaching young people in elementary, secondary, and teacher education schools.

One of the most interesting sessions usually is the one put on by students showing the techniques used in teaching shopwork. Some of the things exhibited at this session usually appear again at Ford Industrial Arts Awards exhibits. This in itself shows that they belong to the best that is produced in our school industrial-arts laboratories.

Some of the things produced by these student teacher trainees are really astounding and they run the gamut of electronic productions to mechanical devices that are outstanding.

Then the convention city itself has much to offer the visitor. There are, of course, the historical tours which interest anyone who cares at all about the early days of our country. Also, the many museums and the library of contemporary art and design are of great interest. Then there is the Boston Museum of Science which houses exhibits of natural history, science, and industry, a model of a U-235 atom, a nine-million candlepower lighthouse lense, and other very interesting scientific objects.

At Harvard the visitor will be interested in the Peabody Museum of Archaeology and Ethnology. The Hart Nautical Museum and other equally attention-arousing museums are on the Massachusetts Technology campus.

All in all, the 1958 American Industrial Arts Association convention should not be lightly omitted from your convention list.

## INTEREST YOUR HIGH SCHOOL GRADUATES TO GO TO COLLEGE

THERE is still time to start a concentrated effort to help your students to make up their minds to attend college. You may have some excellent material in your classes out of which to make engineers, technologists, mathematicians, scientists, as well as teachers of industrial arts and vocational education. Many of the graduating high school students do not yet know just what they want to do after they leave high school. Help them plan the preparation which they need for entry into a worthwhile livelihood, fully prepared to proceed without too much backtracking to advance with the chosen work or something that is allied to it.

Don't forget the schools still are in need of many teachers of industrial arts and vocational education. Look among your graduates whether that group does not contain good candidates for the serious profession of teaching others to fill the loopholes that exist in the educational field. While you are making this search, do not forget the need for workers in the other fields such as are mentioned above. We will always need mechanics, but advise your students that if conditions in the job market become tight, a man who can qualify as a technologist can always get a mechanic's job to help him over the difficulty because he is really prepared to do the work of either the one or the other.

## THAT APPROACHING FINAL EXAMINATION

THOSE year-end grades for your students are due shortly. This brings up the question of tests and final examinations.

Some teachers are still in favor of the essay type examinations. There is no objection to your using them, but the newer types now so commonly used are more easily used and they cover the course or courses you used much more fully.

Many of these tests have appeared in back numbers of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Do not hesitate to use a part or all of those published in our magazine. They are copyrighted only insofar that they may not be published in other books or magazines unless permission has been granted for such use. But the magazine is purposely published to give help to the teacher in his school work. Anything published in our magazine may, therefore, be copied and duplicated by any method for use in your shop or classroom.

And don't forget that the entire test as published may not be 100 per cent perfect. Improve the test items that do not suit you. In this way you will get benefits out of published tests that you would not otherwise obtain.

If you have finally arranged a test that you think is much better than those that other of your coworkers are using, be sure to pass it along. That is the only way in which our profession will advance. What is more, this is one way in which you may repay those from whose efforts you have profited in the past.

## HELPING TOWARD A VOCATIONAL OBJECTIVE

NO MATTER what the shop teacher may do, there are many students who will not concentrate much on the question of what they want to do with their lives until the question confronts them with stunning force on the day of graduation. It is for this reason that industrial-arts teachers should do their utmost to prepare all of their students who are about to be graduated to know just what confronts them, and just what they can do about it at this late date.

The boys who have an idea what they want to do may be directed to make contacts with employers doing the kind of work that the boys desire to do. The sooner that this is done, and the more employers that they contact, the better.

The teacher may help his students by informing employers who are to be approached, and giving them a report on the boys. Then give a talk to the boys to soften the blow of a turn down which they may get under present conditions.

# Shop Safety Check List for Shop Instructors

**C. J. STOTT**
Instructor, Senior High School
Hanover, Pa.

The majority of our nation's accidents are the result of poor personal habits, physical inadequacy, or plain ignorance of the facts. An efficient, well-organized shop is always a safe shop. Dirty work habits, sloppy technique and a careless attitude can never be attributed as qualities of a good craftsman. Good habits of safety and workmanship must be acquired.

The alarming statistics of fatal accidents last year on our nation's highways is a clear indication that the youth of America. in particular, are not safety conscious. It is time for everyone, teacher and parent, to force home a much needed lesson.

### Attitude and Personality

*Yes No*

... ... 1. Do I think, speak, and act in regard to shop safety at all times?
... ... 2. Have I integrated my safety program with what I am teaching, in an interesting, logical manner?
... ... 3. Are my students keenly aware that shop safety is a vital, required part of my shop program?
... ... 4. Do I immediately curb *horseplay* and carelessness in the shop at all times?
... ... 5. Have I explained and demonstrated the need for cooperation among students and teacher when certain jobs of lifting, gluing of boards, and carrying of materials becomes necessary in the shop?
... ... 6. Am I acquainted with the school laws of my state regarding shop safety, negligence, etc.?

### Shop Dress

... ... 1. If students are required to wear shop coats or aprons, do I insist that they be kept neat. clean, and buttoned or tied at all times?

*Yes No*

... ... 2. If students do not wear coats or aprons, do I insist that they refrain from wearing new or loose clothing?
... ... 3. Have I told the students danger of wearing long sleeved shirts, neckties, jewelry, etc., and am I on constant guard to see that no one forgets?

### Material Storage

... ... 1. Is the material on lumber racks, metal racks, clamp racks, etc., stored neatly and safely at all times?
... ... 2. Are all materials stored in proper, convenient places and not left lying about in haphazard fashion?
... ... 3. Are all material storage places sufficiently lighted?
... ... 4. Do I guard against overstocking racks, shelves, etc.?

### Hand Tools

... ... 1. Are my tool panels, tool room, etc., organized in a neat, safe fashion?
... ... 2. Have I told my students the danger of using dull hand tools?
... ... 3. Have I stressed the safety points on the various hand tools during my talks and demonstrations and am I on constant guard to see that the student participation is done correctly?
... ... 4. Have I explained and demonstrated the correct procedure for carrying sharp edged tools?

### Machinery

... ... 1. Is each machine properly located in respect to space. efficiency, and safety?
... ... 2. Are all cutting edges,

*Yes No*

belts, pulleys, etc., carefully guarded?
... ... 3. Is there adequate light for the safe operation of each machine?
... ... 4. Are the machine accessories, for each machine, placed in the proper location? (Avoid reaching over running machines for needed accessories.)
... ... 5. Are all machine switches guarded and properly painted?
... ... 6. Are all machines clean and properly painted?
... ... 7. Are goggles a necessity for the operator of certain machines such as grinders, lathes, etc.?
... ... 8. Have proper safety rules and demonstrations been shown, studied, and talked about informally for the operation of each machine before any student participation?
... ... 9. Is student participation on each machine an individual affair, whereby each student must qualify by passing tests?

### Finishing Room — Acids

... ... 1. Is there proper ventilation in the finishing room?
... ... 2. Is there a special booth for spraying, if much spraying is done?
... ... 3. Are large quantities of combustible materials kept in fireproof rooms or closets?
... ... 4. Are oily rags and waste kept in proper receptacles?
... ... 5. Is the finishing room kept neat and clean at all times?
... ... 6. Are all containers closed tight and stored away from heater pipes or radiators?
... ... 7. Are acids and other harmful agents used in the shop kept in proper containers and clearly labeled and are they stored in a safe place?

**General Safety Rules**

*Yes No*

... ... 1. Is the shop well lighted, clean, free of grease and oil on the floor, and neatly painted?

... ... 2. Does each machine have an adequate safety lane area painted on the floor?

... ... 3. Are all light switches in good working condition and of the right type for each part of the shop? (For instance: mercury switches in the finishing room.)

*Yes No*

... ... 4. Have all lines and electrical circuits been checked for proper load?

... ... 5. Are all plugs and extension cords in good condition? (No splices or poorly taped wires.)

... ... 6. Are you familiar with all fuse panels for your shop? Are proper fuse loads always maintained?

... ... 7. Have the fire extinguishers been checked recently and are they of the right type for each part of the shop in which they are located?

*Yes No*

... ... 8. Do I help promote shop safety by keeping pleasant board displays?

... ... 9. Do I have a fair knowledge of first aid and what to do in case of an accident?

... ... 10. Is there a good first aid chest at my service in the event that I should need it?

... ... 11. Are insurance and accident report papers neatly filed and kept ready (just in case)?

# Problems and Projects

## WHITTLING PROJECT — BAMBARA CARVINGS

**BEN HUNT**

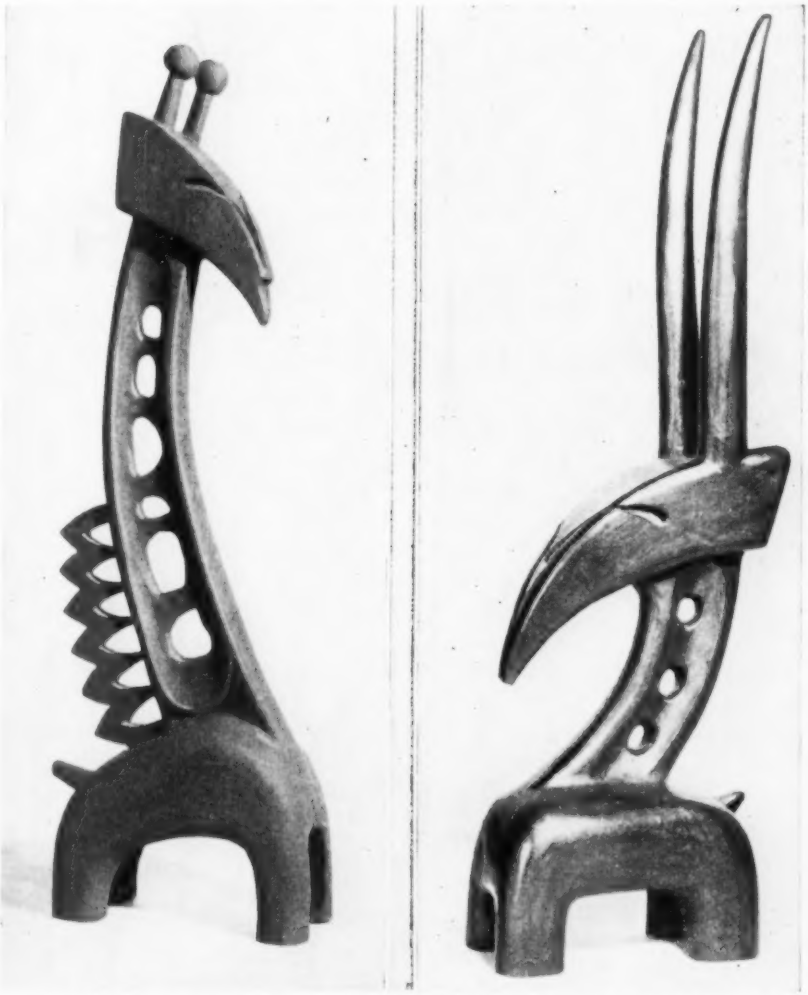
Hales Corners, Wis.

The two carvings for this issue are taken from African French Sudan. They represent an antelope and a giraffe. The antelope was taken from a museum piece while the giraffe was created by the author. These are headdresses and the natives always carve them with the base as shown in the lower right of Figure A and B. They carve them out of one solid piece of wood, sometimes hardwood, and sometimes a softwood. Some are finished in black and some are dark brown. However, these two will have to be painted black so as not to show that they are glued up out of several pieces.

These are not replicas, but were made simply for decoration purposes. They make an interesting pair. I have left the bases off for easier sawing and whittling. This way the parts can be added on a band saw. If a base is desired, it may be added as shown in Figure B, and the carving should be done so that it appears to be made out of one solid piece. When carefully sanded and painted, the joints should not be visible.

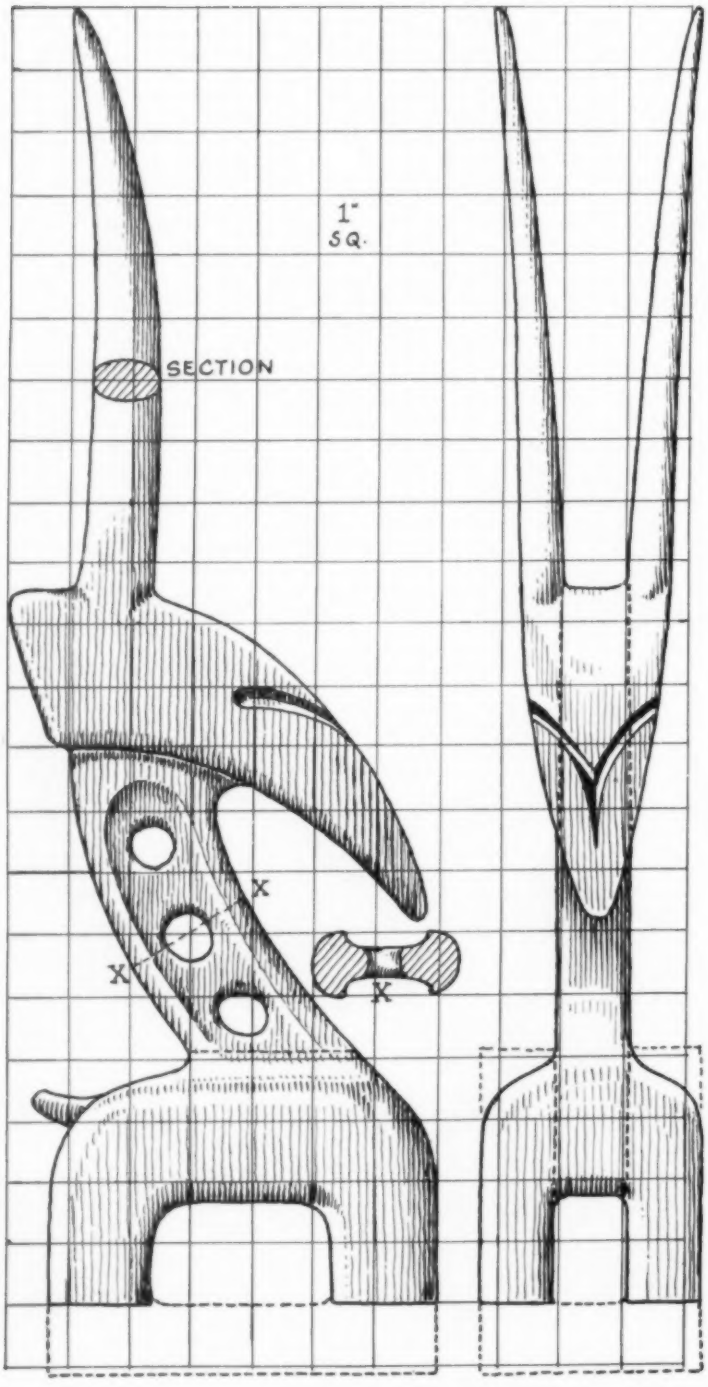
Enlarge the pattern to full size, 21 in. high, using if possible 1⅛-in. white pine or basswood. This is approximately the size of the real carvings. These two are quite plain, but there are some that are very ornate and complicated as the one shown in Figure B. Most likely the young antelope was carved separately.

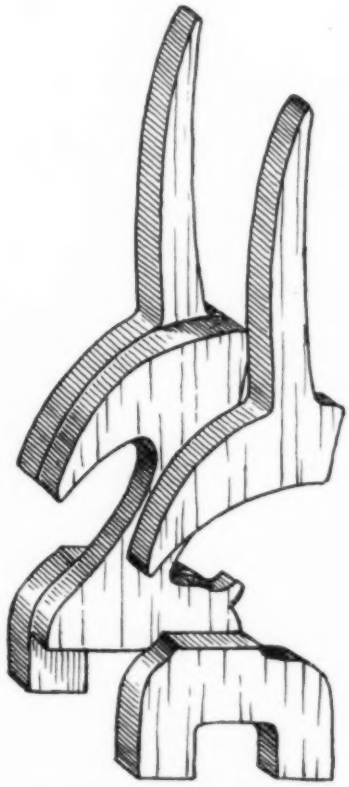
The drawings at the right on both plates show how the pieces are sawed and glued together. Note that the two pieces forming



Giraffe shown with two coats of flat black paint, before applying stove polish. At right, antelope finished with shoe polish as described in the text

# BAMBARA
## FRENCH SUDAN
## •ANTELOPE•



THE 5 SECTIONS ARE GLUED TOGETHER LIKE THIS.

THE BAMBARA HEAD-DRESS BASE WAS AL-WAYS MADE LIKE THIS.

Fig. A. Details of the Bambara Antelope

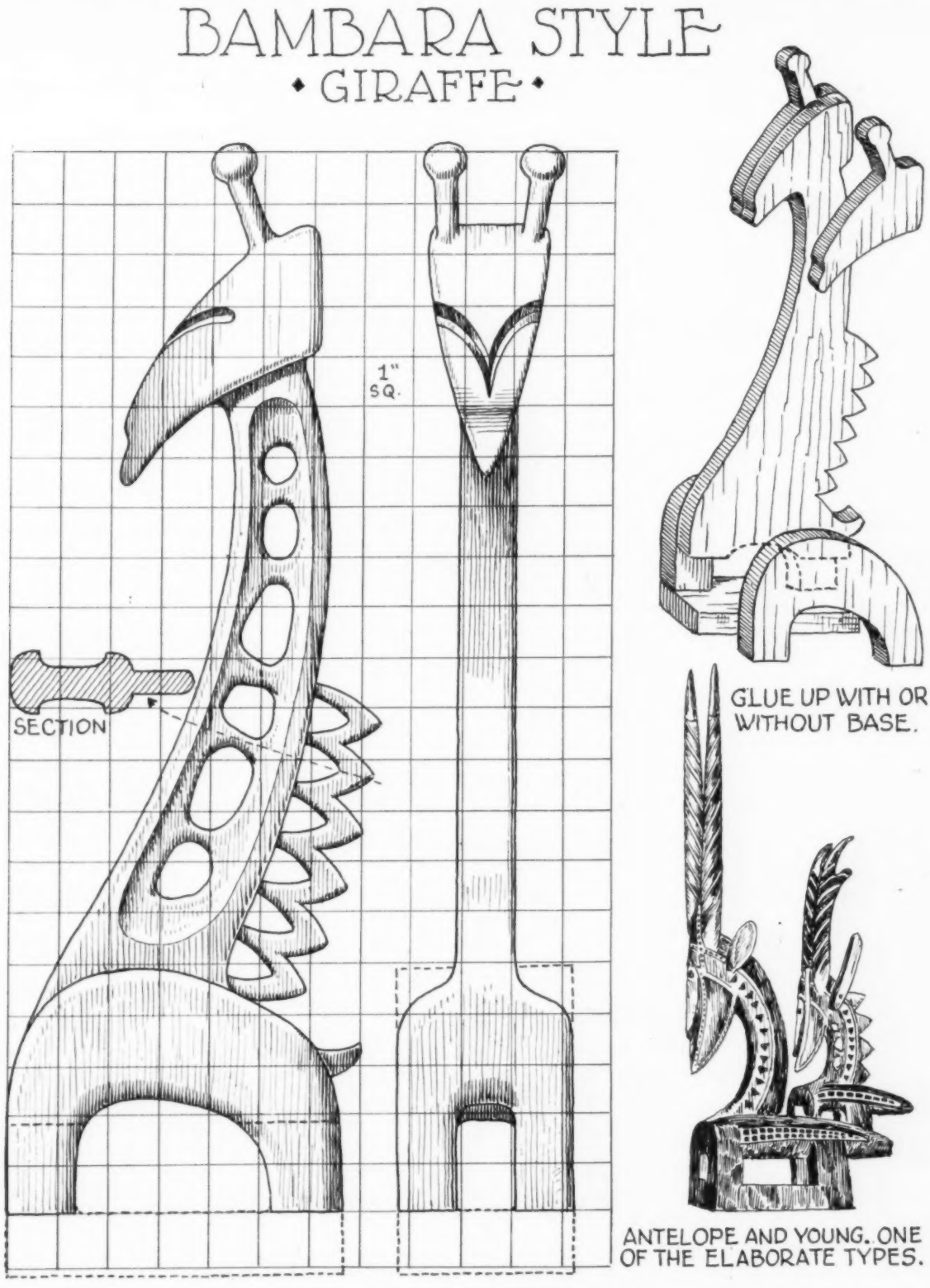



Fig. B. Details of the Bambara Giraffe

the legs should be cut to the heights shown in dotted lines to give an interesting curve at the shoulders.

The openings in the necks may be sawed out before gluing. I whittled the neck with a crooked knife, however, and then bored holes and whittled the openings, which are rather irregular rather than round. Gouging or whittling is simplified if done first. It may be done before gluing although that isn't necessary.

Because of the rather large size much of the roughing out can be done with a spokeshave or large flat chisel, to save time and work. I even used a wood rasp. Some of the native pieces are rather roughly carved, as though done with a small hand adz, and some are finished quite smoothly. But those showing adz or knife marks are sanded or smoothed nevertheless. No two are alike. Note, too, that the heads are a bit narrower than the bodies.

There are different methods of finishing, depending on what paints are handy and since these are solid black, almost any paint will do. However, I gave these a coat of cut shellac and two coats of flat black enamel, rubbing each coat with fine sandpaper. This gave them a beautiful dull finish but would show finger prints from handling. So on the advice of a friend I used a black paste shoe polish to give them the final finish. Just daub it on, let it dry a bit, and brush well, as you would polish your shoes. For a carving of this nature it cannot be beat.

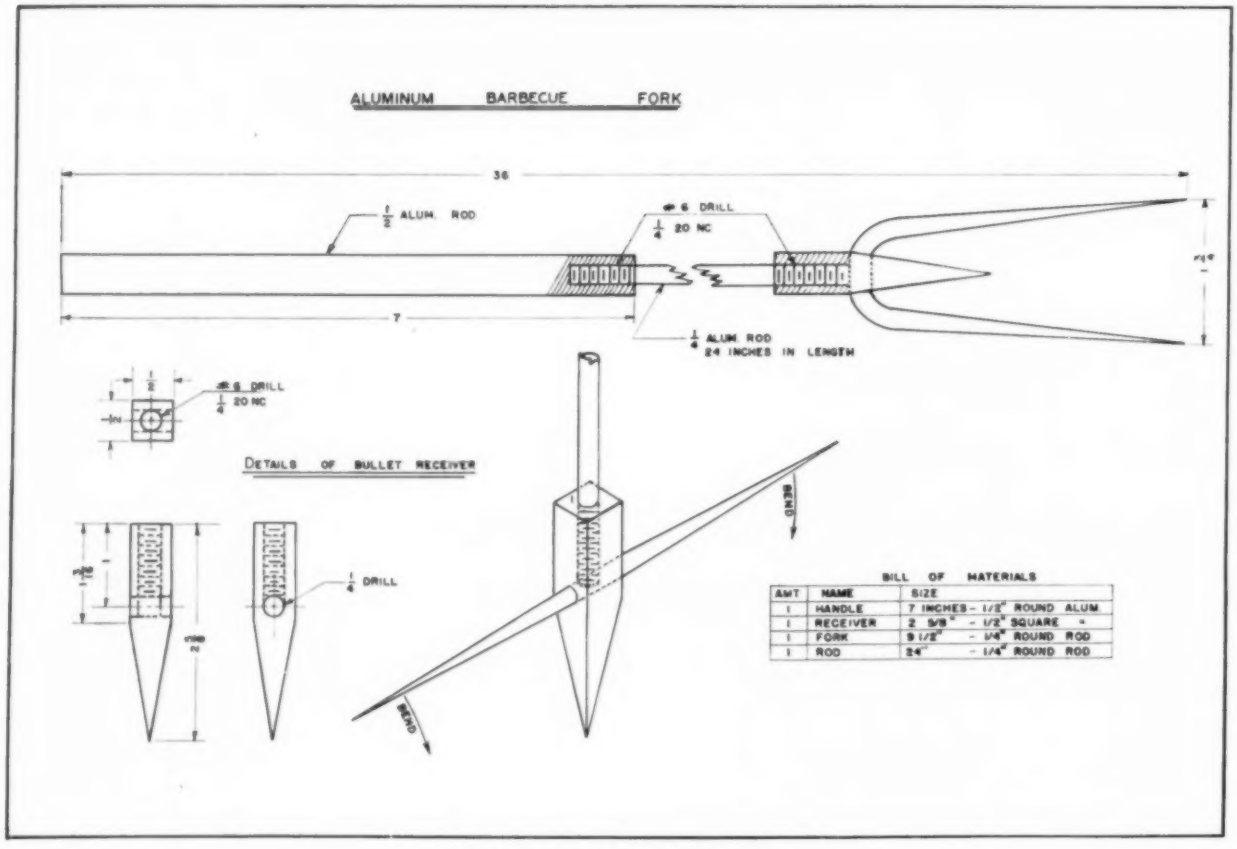
Barbecue forks

The giraffe was photographed before the shoe polish treatment while the antelope is shown polished. I might add that a native carving like the one shown in Figure B would probably run over $500 on the market. These two, described herewith, were made to be set on the mantelpiece, but the giraffe finally went to my daughter's home, as a Christmas gift. Some day I hope to make one of the ornate ones as a companion piece to the present antelope.

## ALUMINUM BARBECUE FORK

**ELMER B. MATTSON**
Industrial Arts Department
Hoover Elementary School
Redwood City, Calif.

The construction of this barbecue fork presents an interesting and challenging experience. The values obtained from this project are numerous. The individual learns to shape and form, drill and tap threads, use of layout procedure and finally, as-


ALUMINUM BARBECUE FORK
36
1/2 ALUM. ROD
#6 DRILL
1/4 20 NC
7
1/4 ALUM. ROD
24 INCHES IN LENGTH
#6 DRILL
1/4 20 NC
DETAILS OF BULLET RECEIVER
1/4 DRILL
BEND
BEND
BILL OF MATERIALS
AMT | NAME | SIZE
1 | HANDLE | 7 INCHES - 1/2" ROUND ALUM.
1 | RECEIVER | 2 5/8" - 1/2" SQUARE "
1 | FORK | 9 1/2" - 1/4" ROUND ROD
1 | ROD | 24" - 1/4" ROUND ROD

Details of the barbecue fork

semble the three component parts into a useful item.

The starting point could be the tapered fork rod. Using ¼-in. aluminum rod, the tapering process can be done in several ways. An electric belt sander, such as the six-inch floor model, will taper the work very nicely. Using safety shield while working with electric belt sander, the work is carefully rotated until the desired paper is obtained. Aluminum being the soft and workable metal that it is, presents an easy task in achieving the tapered fork. The other method of tapering the fork to the desired taper could be done with files.

The rod to be tapered is 9½ in. in length. Taper about three inches of each end.

The bullet receiver requires four important steps. First, measure one inch down from end and drill ¼ in. hole through rod. Next, drill with No. 6 drill, a hole perpendicular to ¼ in. hole. The challenging part now begins. Was a center punch used? Was the layout procedure carefully followed?

Next, thread the perpendicular hole, using a ¼ NC tap. Lay out bottom taper and cut on band saw to shape. File to smooth finish.

The bullet receiver and tapered fork are now ready to be buffed. Buff each piece separately. Once buffing is completed, assemble rod, receiver, and fork. Next, bend the fork into proper shape. This can be done by applying pressure using both hands. Aluminum, being soft, is easily formed. Second, form by applying heat of acetylene torch, being careful not to overheat the aluminum tapered rod. As a final step, attach the handle.

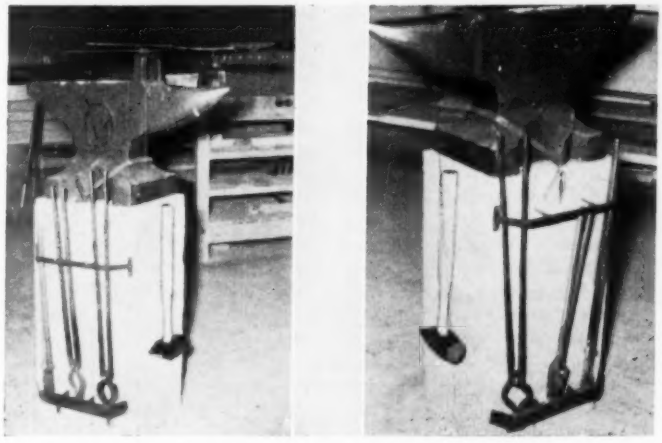
The unique feature of this barbecue fork is that the fork part is retractable and easily stored in a safe position.

## MOUNTING FORGING TOOLS UPON THE ANVIL BASE

**HOWARD ALLRED**
**Shop Teacher**
**Mohave High School**
**Mohave, Calif.**

Although the following method of mounting the anvil tools upon the anvil base may not be new, it evolved from necessity and convenience in our small general shop, which is a converted classroom and space is therefore at a premium.

We have no forge, but with the accompanying anvil-tool unit, and by using the soldering furnaces for heating, the *experience of forging is thereby added, and in a minimum of floor space.* Of course, the soldering furnaces limit the size of projects, but are very useful for punches, chisels, tempering, case hardening, and other small projects.



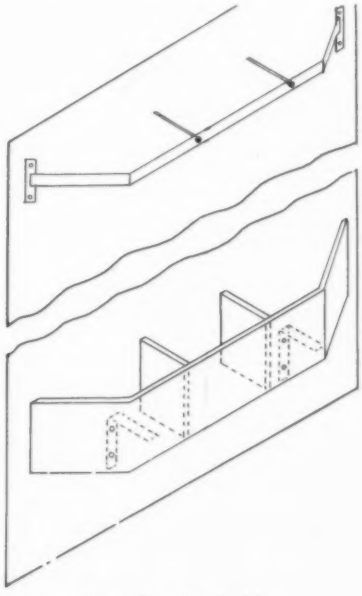
Anvil and tong holder

1. The location of the soldering furnaces and anvil which were far from an already overloaded tool cabinet led to its evolution. It at once took eight large tools from the cabinet and placed them right where they are always needed.

2. Besides the convenience of forging tools being right at hand at the anvil, the whole *area* is a unit and occupies a minimum of space.

3. *Safety.* No matter how much the safety aspect is stressed that all metal is *hot* until known otherwise, it still results in burned fingers when tongs are arranged as usual on a regular forge rail with the *hot lips up.* With this unit, the tongs are placed *down* into the lower holder with handles up. The lower 1½ by 1½-in. angle iron used is a good container that is still low enough so that each type of tong lips can be seen. Thus, if they are thoughtlessly put back *hot*, they are *down*, surrounded by metal and only the cool handles are up for the unthinking student to grasp. That goes for the teacher, too.

4. By having two sizes of blacksmith hammers *right there*, it encourages the use of the proper tool and thus aids in avoiding the students using a smaller ball-peen or other hammer which may be used if he goes to the tool cabinet and selects from an array of hammers.



Base for the holder

### Material

1. *Top Holder:* ⅛ by ½-in. mild steel and long enough to cover most of the width of the base. The ends are bent at 45 deg., and screwed to wood base. Divide into thirds with two spikes or otherwise.

2. *Base Holder: of tong lips:* ⅛ by 1½ by 1½ in. angle iron, same length as top and with ends at 45 deg., and divided into three parts. Braze them in.

3. *Mounting Base Holder:* Cut two pieces of the angle iron about 1 in. long. Drill for wood screws, and then braze to underside and then fasten with wood screws to the base. It is a good idea to use the angle iron for this as *strap iron* angles were found too soft to take the impact of tongs that were dropped in and thus bent.

4. *The Hammer Handles* are drilled and slightly countersunk on both sides. This enables their easy accessibility off and on the rod driven into the base and rounded on the end. Hang two hammers of two different and most used weights. Six kinds of tongs are enough for general shop use. As an added safety measure, the wood base areas on the inside of the lower holder may be covered with sheet metal to protect them in case red hot tongs are placed therein.

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The Pentagon has 7600 windows, 65,000 light fixtures, 3000 clocks, 550 water fountains, and 200 acres of lawn. — *Wisconsin Military District Information Office.*

## BUTTERFLY CHAIR

**LAWRENCE FALBO**
Industrial Arts Teacher
Shadyside High School
Shadyside, Ohio

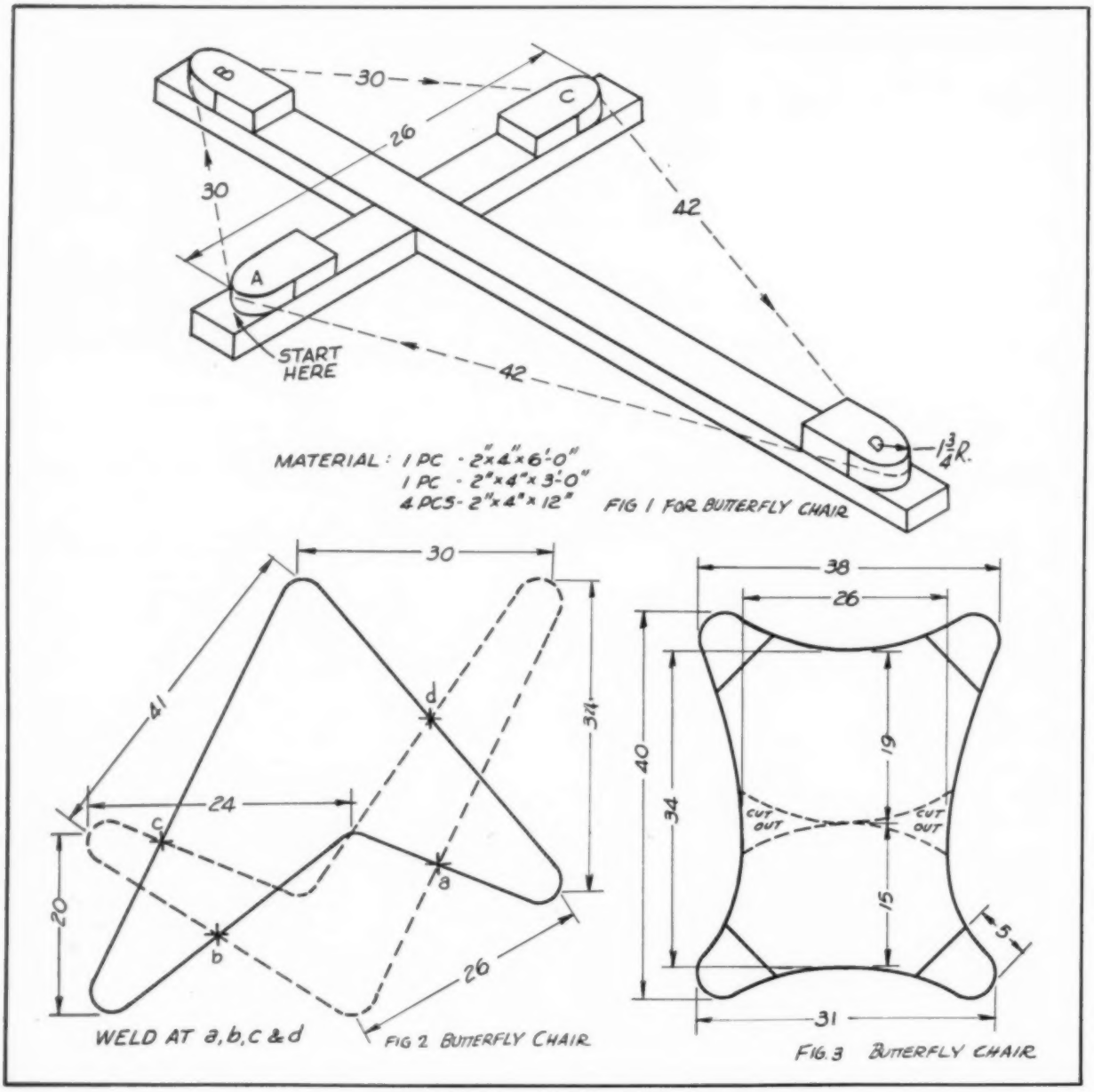
Wrought iron projects have created a great deal of interest in the industrial-arts metal shops. During the past decade, people have been finding more practical uses for wrought iron furniture. In the past, it has been primarily used on porches and lawns, but it now has found its way into the most modern as well as the conventional homes.

After a few preliminary practices in spot welding, tacking, burning, forming, and making simple scrolls, a student should be able to design and construct his own furniture.

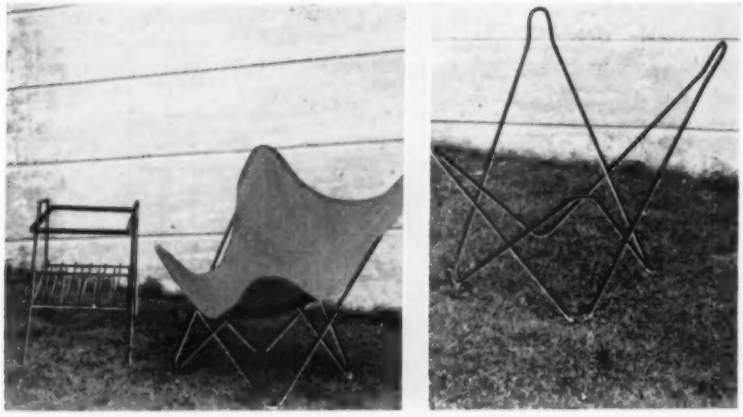
When once the interest has been created in this line of furniture wall decorations, book ends, center pieces, candlestick holders, scroll markers, lamps, tables, magazine racks, book racks, tier tables, wastebaskets, grills, and lawn furniture of all descriptions will start to develop.

Materials needed for this type of furniture may be limited to ¼, ⅜, and ½ in. strap iron, round, and square stock. An acetylene-oxygen welding unit is essential and the instructor will find that useful jigs will be accumulated over a short period. A simple bending jig has been found useful for all types of scroll work.

This course can be made most interesting and fascinating to boys of the junior-senior high school level. It may also create much interest for metalwork at the freshman-sophomore level. The success of this program will largely depend on the instructor's initiative and creative willingness.




Details of the butterfly chair



The wrought iron butterfly chair

— Photographs, courtesy of Bruce Humphrey

**BILL OF MATERIALS**

2 pcs. ½ round cold roll steel — 12 ft. long
4 pcs. ⅝ in. garden hose — 2 in. long
1¾ yds. duck or awning material to be used for cover
5 yds. twill tape — 1 in. wide
2 spools thread

### Procedure

1. Construct a jig as shown in Figure 1.
2. Before bending, slide on two pieces of ⅝-in. garden hose 2 in. long. Space the first one 15 in. from the end of the rod and the other about 45 in. from the same end. Be sure that they are not too far from points A and C. These are to be used as chair tips after the chair is completed.
3. Heat about 2 in. on both ends of the 12 ft. rod and bend slightly toward each other before placing it on the jig. These ends will meet at the completion of one half of the chair. The two ends together will form an arc around point A.
4. Clamp one end to the jig at the center of point A. A 6-in. clamp will be suitable for this purpose.
5. The long end of the rod should be pointing toward point B. About 2 in. away from your wooden jig, at point B, heat three inches with a welding torch, bend rod around point B and move toward point C.
6. Repeat the same operation at point C and point D. The two arcs that were made first should meet at point A. This is where it should be welded.
7. After welding the two arcs together at point A, remove rod from the jig and clamp it to a table in such a position that you may apply heat to points A and C respectively without burning the table.
8. Heat at point A and point C and begin to bend by raising point D until it is 41 in. from point B. This should complete one half of the chair. Repeat all operations with the other 12 ft. piece of round stock.
9. When both have been completed, place them in such a position that they are diagonally from one another forming a chair.
10. Be very careful in adjusting the height of the chair. The backs should be 34 in. from the floor and 30 in. apart. The fronts of the chair should be 20 in. from the floor and 24 in. apart. Measure from the center of the bends. When adjusted properly, clamp and weld at each cross piece. There should be four welds.
11. After the welds have cooled, slide rubber hose sections on points that are touching the floor. This is to prevent scratches on porch or living room floors.
12. Paint chair with a flat black paint.
13. Cut out pattern of cover according to the illustration shown in Figure 3.

### Suggestions

1. Points A-B-C-D should be covered with a thin piece of sheet metal to protect the wooden jig from burning.
2. In order to make good curves, a minimum of 4 in. should be heated at one time.
3. Be sure that the pieces of rubber are not moved until points have been cooled.
4. You will have plenty time to make a curve once your metal is heated. If it should cool before the curve is made, reheat it at the same point.
5. The top half of the cover shown in Figure 3 is cut out lengthwise on the material and the bottom half of the cover is cut out crosswise. Sew together at the center seam and bind seam with twill tape.
6. Cut pockets out of excess material.

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If youngsters are giving books hard wear, apply a thinned coat of fresh, white shellac to the covers. That is what librarians do. — *Shellac Information Bureau.*

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Are you a menu collector? To keep the corners from curling, apply a thinned coat of pure, white shellac. — *Shellac Information Bureau.*

## TOOLMAKERS V BLOCK

**LAWRENCE A. BRUNO**
Instructor, Mechanical Engineering Department
Michigan College of Mining and Technology
Sault Ste. Marie, Mich.

Here is a project suitable for advanced machine shop students. The *V* block can also be useful to the student. Included in this project are various operations, such as milling and shaping, boring on a lathe, tapping, threading with a die, turning stock on a lathe, and filing and polishing. Following is a step-by-step procedure for making your own *V* block.

### Tools and Equipment

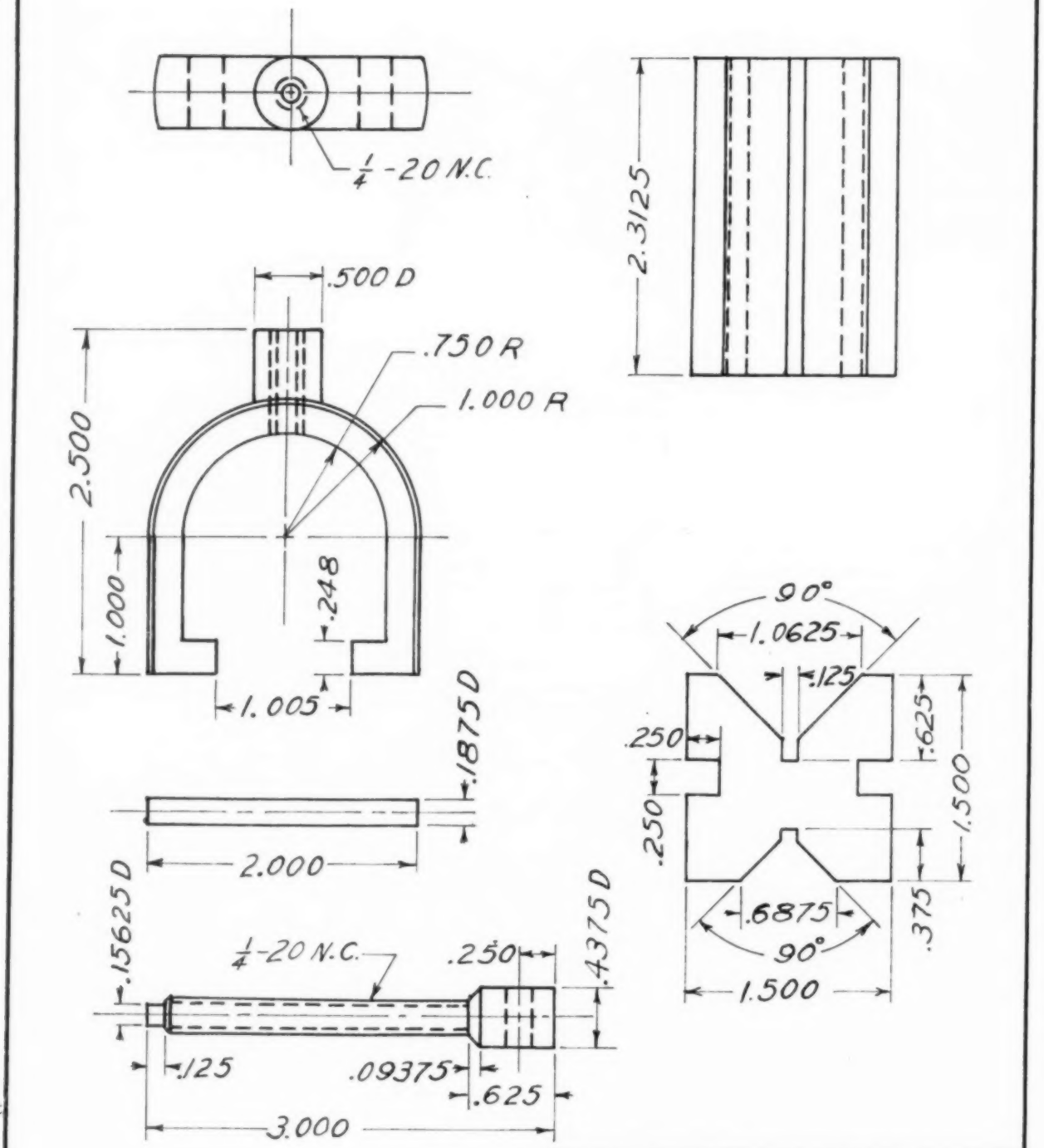
Six in. combination square, scriber, file card, dividers, parallel bars, drill chuck, boring bar, round nose turning tool, ¼-20NC. tap and die, specified drills, hack saw, ⅛ in. mill slitting saw, ¼ in. and ½ in. side mill cutters, lead hammer, indicator, inside caliper, ball-peen hammer, center punch, cut-off tool, 90 degree angle plate, 2 *C* clamps, 1–2 in. micrometer, 3 jaw chuck, combination center drill.

### List of Materials

1.500 in. by 1.500 in. by 2.312 in. Cold rolled mild steel
.4375 in. diameter by 3.000 in. C.R.M.S.
2.500 in. by 2.000 in. by .500 in. C.R.M.S.
.1875 in. diameter by 2.000 in. steel welding rod
Prussian Blue
Coolant and White Lead
80 grit Emery Cloth

### Procedure

1. Surface grind four sides parallel.
   *a*) Wear safety glasses.
   *b*) Break sharp corners with a file.
   *c*) Dress wheel.
2. Shape ends square.
   *a*) Check surfaces for squareness with the combination square.
   *b*) Square one end and then set end on parallels.
3. Lay out the two *V*'s and side grooves.
   *a*) Coat all surfaces with Prussian Blue.
   *b*) Accurately scribe layout lines.
4. Mill side grooves.
   *a*) Seat work on parallels.
   *b*) Align ¼ in. side mill cutter with scribed groove.
   *c*) Use a coolant.
5. Align scribed *V* with edge of vise jaw.
   *a*) Use a scale for spacing *V* line above vise jaw.
   *b*) Seat work on parallels.
   *c*) Tighten vise jaw securely, use lead hammer.




Details of V block and yoke

6. Cut recess in bottom of *V*'s with a ⅛ in. mill slitting saw.
7. Finish grind ends on the surface grinder.
   *a*) Clamp *V* block on to the angle plate.
   *b*) Wear safety glasses.

### Yoke

1. Lay out the yoke.
   *a*) Coat front and end surfaces with Prussian Blue.
   *b*) Scribe the 1.000 and .750 in. radii, using dividers.
   *c*) Locate and center punch the .500 in. diameter on the end surface.
2. Center yoke accurately in a four jaw chuck, with contour edge to be machined protruding. Check accuracy with an indicator.
3. Machine a series of cuts with a round nose cutter following the scribed contour of the yoke.
4. Drill tap hole for screw handle thread.
   *a*) Place drill chuck in lathe tail center.
   *b*) Use a coolant.
5. Transfer yoke to a bench vise, and file machined contour surface.
6. Reset yoke in four jaw chuck, parallel to the chuck face. Align center mark with tail stock.
7. Step drill yoke to within .250 in. of finished size.
8. Bore yoke to finish size. Check accuracy with internal calipers.
9. Finish cutting out yoke with a hack saw or band saw.
10. Tap ¼-20 NC thread.

### Screw Handle

1. Place stock in a universal chuck.
   *a*) Face the ends.
   *b*) Center-drill the end for the tail-stock center.
   *c*) Turn the thread diameter.
   *d*) Cut recess on screw.
2. Drill hole for pin.
   *a*) Locate and center punch the hole.
   *b*) Drill hole perpendicular to screw handle.
3. Cut ¼-20 NC threads with a die.

### Pin

1. Form the ends with a file.
2. File pin and polish with emery cloth.
3. Force fit pin.

### Finish and Assembly

1. File parts and polish with emery cloth.
2. Assemble the *V* block according to the drawing.

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The U. S. Army was born June 14, 1775, exactly two years before the Congress officially adopted the Stars and Stripes as the U. S. Flag. — *Wisconsin Military District Information Office.*

## COMBINATION FERNERY, AQUARIUM, AND BIRD-CAGE HANGER

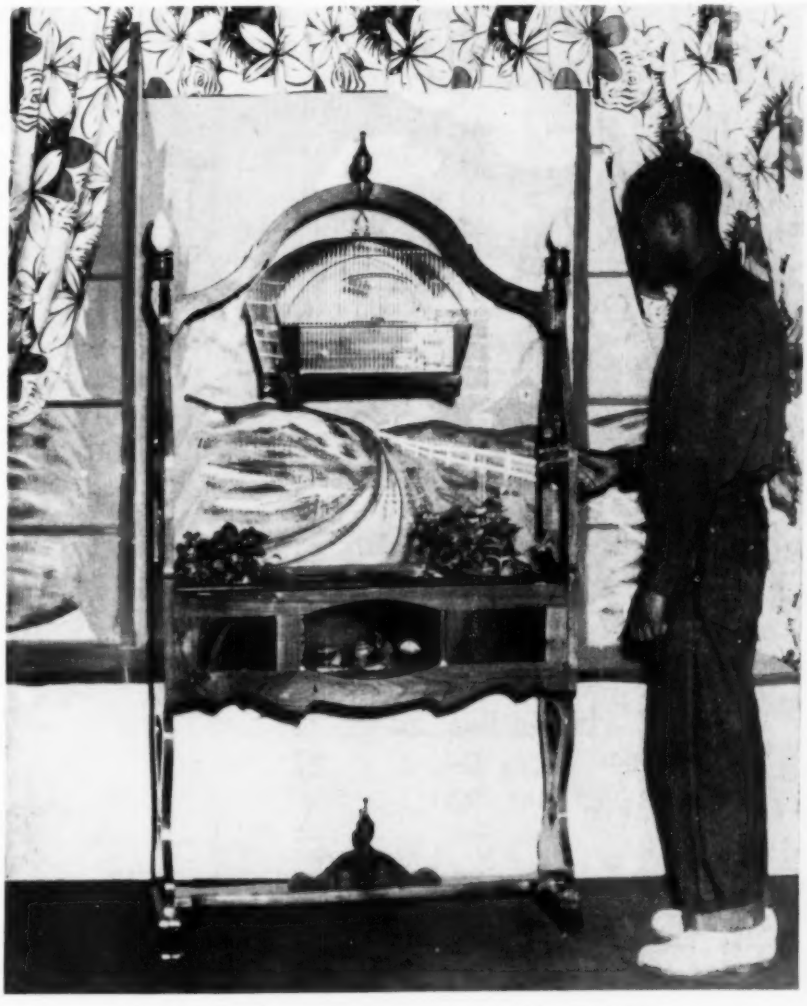
**L. D. JENKINS**
Woodworking Instructor
Garfield Occupational School
Dayton, Ohio

### Determining Suitable Projects

There are several methods used by industrial arts teachers in attempting to discover projects which are best suited for their pupils. Some of the most workable methods include: (1) assigned projects to test the pupil's ability in utilizing the shop equipment at hand, (2) present groups of projects whereby the pupils might make a selection in order that more interest may be displayed by the pupil throughout its construction, (3) select some outstanding project for the pupil which will present a challenge in every respect.

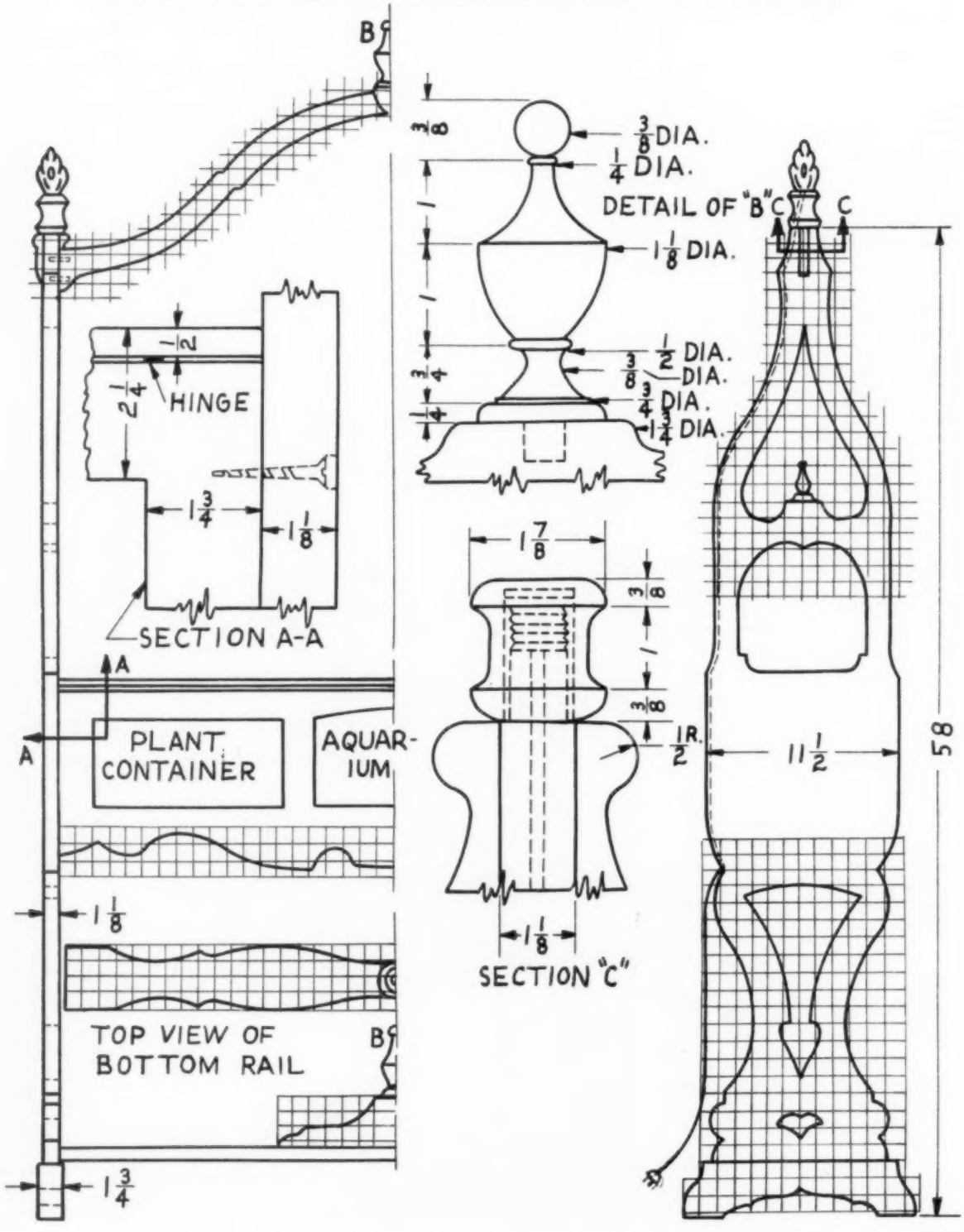
Some pupils who are capable of doing outstanding work lack initiative in choosing a suitable project. In such cases then, it becomes the duty of the instructor to take on a more suggestive attitude in securing a project that will arouse in the pupil a deep feeling of satisfaction and accomplishment in doing the job. Instructors too often neglect this type of pupil in an effort to satisfy the general run of students, and are prone to allow our highly rated pupils to drift nonchalantly until they become discouraged with the entire industrial-arts program.

Since most projects appealing to pupils are made for home use, the pupil takes pride and interest in something designed for that purpose. One of the most popular features of the modern home is the innovation of the picture window. Hence, this



Combination fernery, aquarium, and bird-cage hanger.
— Edward B. Taylor, photographer, Dayton, Ohio

# COMBINATION FERNERY, AQUARIUM, AND BIRD-CAGE HANGER




Details of the combination fernery, aquarium, and bird-cage hanger

project was designed to enhance that area of the home which has become the center of attraction.

### The Project

The project was designed for several purposes: first, to challenge the pupil's ability; second, to give more life to the home; third, to consume as little floor space as possible for the individual student; and fourth, to combine in its design, multiple utility values.

The combination bird-cage hanger, aquarium, and plant-stand is a project that requires systematic planning, accurate layout of various members, and a careful manipulation of hand and machine tools. The project features an attractive piece of furniture for the modern home combining several home utility values which are concentrated in a comparatively small area. In general, it lends an atmosphere of trim and natural beauty to the picture window area.

The finial, which enhances the top of the arch supporting the bird cage is duplicated in the ornament which decorates the bottom rail. The panel in the front and back sections were veneered with crotch walnut over plywood. The containers for the plants were made in the metal shop and a ¼-in. spout was centered at the bottom to give adequate drainage. A hook was soldered near the spout to receive a can to catch the drainage after watering the plants. The lights at the top of each end support, furnish a soft light for the room. The wires connecting the lights, were placed into a groove down the back edge of each end support and a spline of the same material set in to conceal the wire completely.

The aquarium, which is a commercial product, is fitted snugly into the middle section and can be removed easily as can the plant container. The bird cage is also a commercial item but can be substituted for any kind of hanging potted plants. It consumes only four square feet of floor space and its general design may harmonize with most any type of furniture. The project as a whole gives the modern home an attractive piece of furniture which will add more prominence to the picture window and give more life to that particular area.

The background was designed and painted by the art department as an integrated project imitating an interior view from the picture window area. The material used in the project was American black walnut. It was varnished and rubbed to a dull finish with good effect.

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**Fireplace tools should be maintained during the off season. Sandpaper marred spots and wipe clean. Then apply a thinned coat of fresh, white shellac. It will help prevent rust.** — *Shellac Information Bureau.*

## A SAFETY DEVICE FOR LATHE SWITCHES

**QUENTIN J. KING**
Metal Shop Instructor
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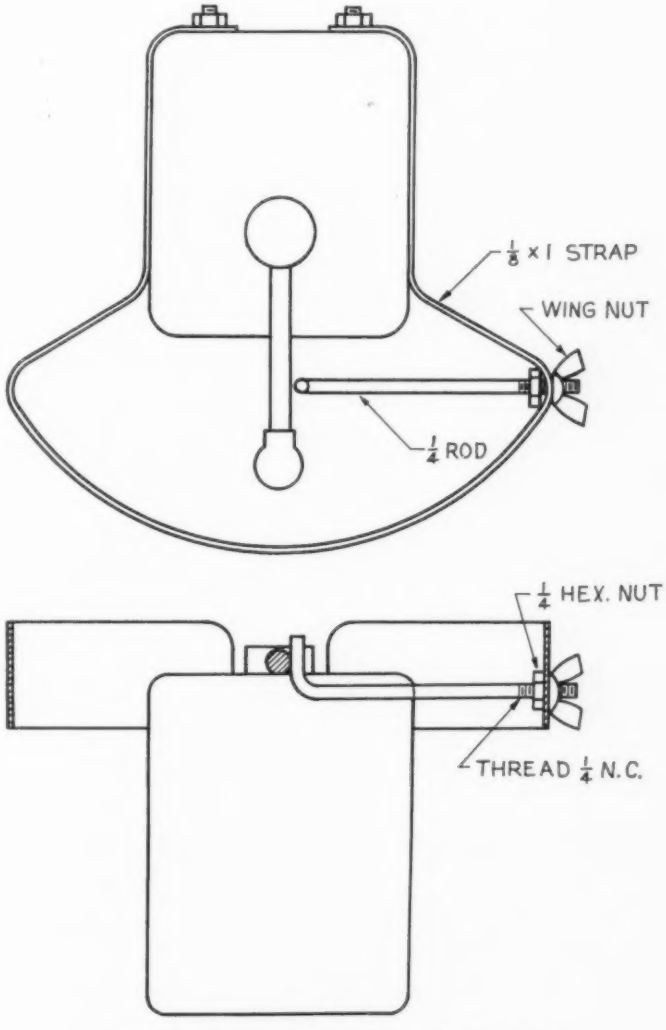
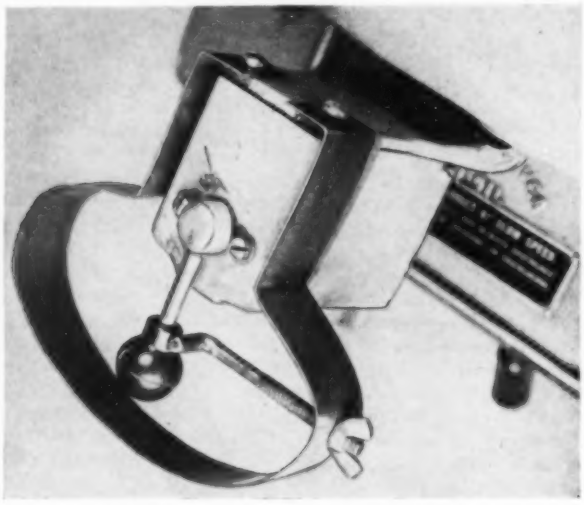
Not least among the many safety worries of the metal-shop teacher is the safe operation of the metal lathe. Probably most of us have had horrible visions of what might happen if a lathe were accidentally turned on while a student was in the process of mounting a chuck or doing some other setup operation. Since most lathes are equipped with reversing switches, the possibility of reversing the lathe and spinning a chuck off is another ever present danger.

Illustrated is a safety device for lathe switches which has proved its worth in my shop for some time. It consists of a metal band surrounding the switch handle and a stop which prevents the switch from being turned to the reverse position. The band can be made of 1 by ⅛ in. mild steel or aluminum. The exact shape and size of the band will be determined by the length of the switch arm. Since reversing switches differ considerably, the method of fastening the band will have to be worked out to fit the particular switch. In most types it can be fastened to the mounting bracket bolts in the back of the switch case. The original bolts may have to be replaced by longer ones.

The reversing stop is made of quarter inch mild steel rod, threaded on one end and bent at a right angle on the other. A quarter inch nut is placed on the inside of




Details of the safety device for lathe switches



Safety device for lathe switches

the band to act as a stop, and a thumb screw on the outside, holds the rod in position. So long as the rod is in a vertical position the lathe cannot be reversed. If it is necessary to reverse the lathe, simply loosen the thumb screw and rotate the stop downward so that the switch handle will swing over it.

## A TIME-SAVING METHOD OF JOINTER ADJUSTMENT

**ROBERT D. BROWN**
Assistant Professor
Industrial Arts Department
Northern Illinois University
DeKalb, Ill.

The jointer has long been, and still is, an indispensable machine tool in the industrial-arts shop. With one or two exceptions it is used more frequently than any other machine.

Undoubtedly the jointer's popularity is due to its durability, simplicity, and capacity for exact work. Adjustments are few, and only one — the vertical placement of the outfeed table — presents real difficulty. Unfortunately, however, it is this adjustment which has the greatest effect on the accuracy of the machine.

The outfeed table must be set so that it is exactly level with the cutting edge of each knife at its highest point of travel. A higher adjustment results in a taper being cut. A lower adjustment allows the last inch or two of stock to drop and be cut more deeply as it leaves the infeed table.

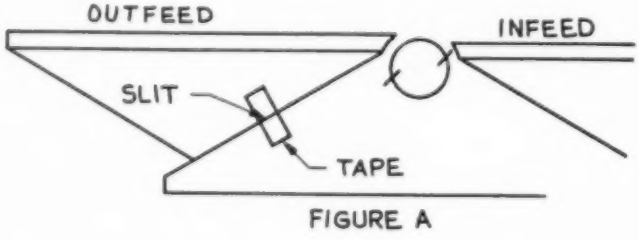



FIGURE A

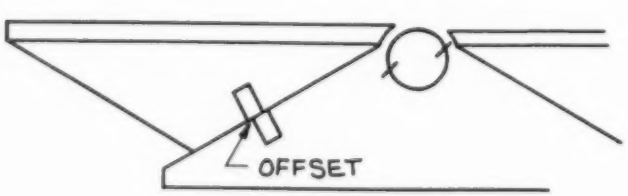



FIGURE B

A jointer adjustment method

Ordinarily, the outfeed table is set with a straightedge, given a trial-and-error check with a piece of stock and readjusted, if necessary, to satisfactory position. Once set, the outfeed table is not moved except to cut a taper or recess or when the knives are being changed. If the setting is changed it is necessary to repeat the adjustment process — a time-consuming task complicated by an extremely slight margin of error.

A useful method of indexing the jointer so that a correct outfeed table setting may be changed and reset quickly and accurately is as follows:

1. Adjust the outfeed table so that it is correctly positioned with respect to the knives.
2. Adhere a strip of masking tape to the front side of the jointer so that the tape extends *across* the joint line formed by the inclined ways. Use a razor blade to slit the tape along the joint line. (See Figure *A*.)
3. When the original correct setting of the outfeed table is changed (as in Fig. *B*) the two halves of the strip of tape are offset. The original setting is quickly restored by bringing the two halves back into alignment.

A pencil line drawn with a straightedge across the joint line of the ways can be substituted for the strip of tape. A permanent or semipermanent indexing device, such as a painted line or a mark made with a cold chisel, must not be used, since it is necessary to reconstruct the index each time the knives are changed.

## ADHESIVES FOR WOODWORKING

**C. VERNON SIEGNER**
Assistant Professor of Industrial Arts
Colorado State University
Ft. Collins, Colo.

### History of Adhesives

Archaeological findings in ancient tombs give evidence that the ancient Egyptians were familiar with animal glues as early as the reign of Thutmose III, about 1500 B.C. Bas relief murals found in Thebes tombs show that hot sandbags were used by the Egyptians to weigh down flat work and dry the adhesive at the same time. A chest uncovered from the tomb of Tutankhamen (*c.* 1365 B.C.), in 1922 gives evidence that animal glues will give a bond lasting over 3300 years under favorable conditions.

Until the earliest part of the twentieth century, animal glues had few competitors for woodworking. At the present time, however, a renaissance has taken place in the wood adhesive field. Modern adhesives make the bonding stronger than the wood itself so that today's craftsman can use simple joints and obtain stronger bonds than the older time consuming joints.

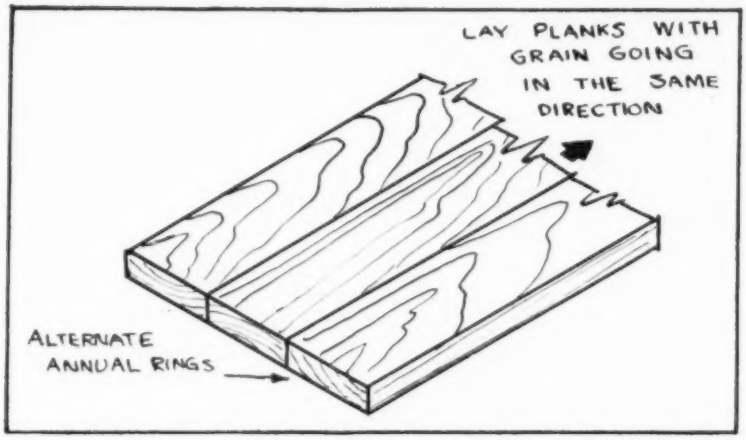



Fig. 1. Edge gluing

### Types of Adhesions

The Forest Products Laboratory at Madison, Wis., give two way adhesives bond materials; these are mechanical adhesion and specific adhesion.

Mechanical adhesion takes place in most wood joints. Here the adhesive enters the pores of the wood and solidifies making a strong joint.

During specific adhesion, on smooth nonporous wood such as ebony, the adhesive does not penetrate into the wood pores and dries on the surfaces.

Both specific and mechanical adhesion are found in most wood joints.

### Preparing Wood Surfaces

Before gluing wood, check to see that your material is dry, clean, and smooth. Wood should not be glued that has less than 5 per cent or more than 15 per cent moisture content; 5–6 per cent moisture content is preferred for cabinetwork. Surface dirt and grease should be removed so pores will not clog when the adhesive is applied. The surfaces should be planed just before gluing; avoid putting two rough sawed surfaces together. Forest Products Laboratory tests show that sanding planed surfaces is not necessary as adhesives work just as well on planed stock. Allow wood to stand in a warm room to condition it before truing bonding surfaces.

After checking the condition of your wood be sure to match the grain pattern. When making a plank table top, have the grain going in the same direction with the annual rings on the end grain alternating to prevent warpage as in Figure 1.

Carefully select your clamps when bonding your stock. Long pieces of lumber usually require bar clamps, short pieces *C* clamps or hand screws. Always protect the surface of the wood from metal clamps as the metal will eat into the wood when pressure is applied. Clamp your pieces together before applying the proper adhesive so you can check your joint for tightness. If a tight joint is not attained, resurface uneven stock and retest.

Choose the proper adhesive for your special type of wood and the purpose for which you will use the wood. Some adhesives come prepared, others must be mixed according to the manufacturer's directions. Be sure your container is clean and not a copper base alloy for best results. A stiff bristled brush is preferred by most craftsmen for applying adhesives although wooden sticks are also handy. Adhesives generally work better if applied in thin even coats over the entire surfaces to be bonded. On porous woods and end grain, first apply a thin primer coat of the selected adhesive and when tacky, brush on the second coat, then join surfaces.

Apply proper clamp pressure to force your joints together; do not however, apply too much pressure or your wood may buckle or too much adhesive forced out. Some *squeeze-out* should occur but seldom is pressure greater than 80 pounds required for the average shop project. When gluing large projects, bar clamps should be used every foot and should be alternated to prevent buckling.

### Choosing the Proper Adhesive

*Polyvinyl Adhesives.* Shortly after World War II the government released the white ready-mixed polyvinyl adhesives to the public. This group of adhesives is now the most commonly used in school shops because it is in liquid form, does not stain, is alkali, acid, and alcohol proof. This adhesive is a thermoplastic and is softened by heat; above 140 degrees polyvinyl adhesives creep. Because it sets up fast (30–60 minutes) this adhesive does not tie up clamps for long periods of time. Another advantage is that this type of adhesive is not hard on hand and machine tools and does not leave a dark line on the wood that is glued together.

Polyvinyl adhesives must be applied quickly before they set, within four minutes, and should be applied at temperatures from 60–100 degrees. Only moderate clamping pressure is necessary with this class of adhesives and if the craftsman waits about ten minutes until the *squeeze-out* excess glue hardens, he can peel it off easily with a chisel. This adhesive is only moderately water resistant.

Brand names for polyvinyl adhesives include Elmer's Glue-All, Le Page's Sure Grip White Glue, Weldwood Presto-Set, Swifts, Wilhold, Craftsman's Liquid Stainless Glue, Dunlap's Quick Set, and Franklin's Evertite Liquid White Glue. Most of these adhesives are available in both squeeze tubes and plastic bottles.

### Plastic Resin Glues

Plastic resin glues are very strong, leave a light colored joint, and are quite water resistant. They are also rot, bacteria, and fungus-proof. These adhesives are good for extremes in temperature and humidity. They should not be used on oily woods or loose joints, however.

Plastic resin glues come in powdered form and are either mixed with water or a special catalyst. Read manufacturer's direction concerning mixing. For best results the glue and wood should be at temperatures of at least 70 degrees.

Since the mixture will remain spreadable for only about three hours, mix only enough for your immediate job at hand. Application of a thin coat to one surface only is recommended with heavy clamp pressure. Apply clamps within ten minutes after spreading glue to bonded surfaces. The setting time is from four to eight hours depending on the type of wood, brand of adhesive, and temperature of bonding materials. Wash off spilled glue with cold water.

Brand names of plastic resin glues include Weldwood Plastic Resin Glue, Le Page's Plastic Resin Glue, Cascamite Urea Resin Glue, Formica Urea Resin Glue, and Craftsman Plastic Resin Glue.

### Casein Glues

Powdered casein glues are unexcelled for oily woods such as yew, teak, pine, and rosewood. They are also excellent for gap filling or rough surfaces. Casein glues are made from the curd of milk and are usually mixed with one part casein powder to two parts water by weight.

The solution should be stirred until thick, let stand for about 15 minutes to dissolve the powder, and restirred until creamy. After a half hour's waiting time, use the adhesive. The solution will last about two hours when mixed and stains acid woods such as beech, mahogany, and oak.

Use a thick coat of casein glue on bonded surfaces at any temperatures from above freezing to below boiling. The setting time on casein glues is from two to seven

hours. You have about ten minutes assembling time before clamping after applying the glue. Maximum strength is reached in about six days.

The main disadvantage of casein glues is that it forms an extremely hard glue line that is hard on hand and power tools. Since casein glue is not waterproof, it should not be used for marine equipment or outdoor furniture. When gluing oily woods, the acid should be naturalized by coating the joints with a 10 per cent solution of caustic soda, flushed with clean water, let dry, then glued. Spilled glue should be promptly washed off with cold water.

Brand names of powdered casein glues are Casco Powdered Casein Glue, Craftsman Casein Glue, and Old Reliable Casein Glue.

### Resorcinal Formaldehyde Glues

The resorcinal formaldehyde adhesives are the only waterproof glues on the market today and should be used for outdoor furniture, marine equipment, and any other use involving extreme weather or moisture. These adhesives are dark in color and are thermosetting — not softened by heat. Materials to be bonded should be at least 70 degrees.

The glue should be mixed fresh usually using 3 parts catalyst powder to 4 parts liquid resin. Thin coats applied to both surfaces work best with moderate clamp pressure. This mixed glue should be used within two hours after mixing and sets from eight to ten hours. This new adhesive is not common stock in most hardwares and is usually difficult to obtain in smaller towns; the price is also higher than other adhesives.

Brand names include Weldwood Resorcinal Glue, U. S. Plywood Phenol Resorcinal Glue, and Elmer's Waterproof Glue.

### Flake Hide Glues

Flake Hide glues are made from cattle and oxen hides. This *hot* glue was the first glue used by early man and its bond will last, under favorable conditions, more than 3000 years.

You usually purchase this glue today in flakes which are soaked in cold water until they are soft. The adhesive is then heated in a double boiler type glue pot to about 140 degrees until the granules dissolve. For each ounce of glue, use about two ounces of water. For best results warm the wood and glue and work in a room at least 70 degrees. When cold do not rewarm the adhesive or you will lose a great deal of the strength of your bond. Mix only enough for one day's work.

Until the newer resin adhesives came into industrial practice, flake hide glues were widely used in furniture construction because the joint was light colored and had good gap and crack filling properties.

The main disadvantage of "hot" glues is that they are not mold and fungus proof, require special equipment (such as a glue pot), and take more time to prepare than other adhesives.

Flake glues take from 12 to 24 hours to set and should not be used around dampness.

Brand names include Craftsman Hide Glue and Peter Cooper Cabinet Glue.

### Liquid Hide Glues

Because it is fairly strong, already mixed, resists heat and cold, and fills cracks and gaps, liquid hide adhesives have largely replaced flake hide glues in school and home workshops. These glues are usually held in a liquid state by the addition of a plasticizer such as glycerine or acetic acid.

Liquid hide adhesives should not be used around water as they are not water resistant. This glue works best if warmed to 70 degrees and should be applied to both surfaces; when surfaces are tacky, close the assembly and apply adequate clamp pressure. Setting up time for liquid hide adhesives is from 12 to 24 hours depending upon the adhesive.

A brand name is Franklin's Liquid Hide Glue.

### Liquid Fish Glue

Fish glue is a liquid adhesive made from choice salted cod fish scraps such as heads, tails, and fins. The advantage of fish glues is that it can be applied cold in any temperature, is sold mixed and ready to use, and is slow setting allowing plenty of time for assembling. These adhesives are used widely for toy making and furniture repairing.

The strongest bond can be formed by applying a thin even film on both surfaces, let surfaces set for five minutes, and then adding another thin coating before placing pieces together. On soft woods several heavy coatings of glue are recommended at 10 minute intervals, on hard woods thin coats are advised. Use heavy clamp pressure with fish glues. The setting time is from 12–24 hours.

Brand names for liquid fish glues are Le Page's Liquid Glue, Roger's The Best Liquid Fish Glue, and Old Fashioned Strong Glue.

### Contact Cements

The new rubber base contact cements are invaluable for bonding plastic laminates, veneering, and inlaying work. These cements should be applied liberally and allowed to set about 40 minutes until they are dry. Workroom temperature should be at least 65 degrees during operations. When surfaces are no longer shiny they should be bonded by contact. Use a hand roller with heavy pressure to obtain a permanent bond pressing the roller over the entire assembly.

Contact cements resist oils, greases, are nonstaining, and water resistant. When dry contact cements will withstand temperatures from 30 degrees to 200 degrees. Lacquer thinner cleans off excess contact cement.

Brand names are Weldwood Contact Cement, Formica Contact Cement, Roltite, and Armstrong's Adhesive D-243.

### Cellulose Adhesives

Cellulose adhesives are frequently used for modelwork or patching small surfaces. A thin film should be applied to both surfaces and no movement should take place during bonding. Because these adhesives are not strong and are expensive, they are used only for small projects.

Brand names are Du Pont's Duco Cement, Le Page's Miracle Mender, Testor's Airplane Cement, and Comet Airplane Cement.

### In Conclusion

There is an all-purpose adhesive on the market today. The quality of your glue joint depends upon factors such as the type of wood you prepare for gluing, the type of adhesive you use, the type of joint, and the procedures you follow.

Except for polyvinyl adhesives and contact cements, allow the closed joint to stand for a few minutes without pressure, then apply even pressure.

Choose the adhesives that best suit your needs and use them correctly for best results.

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## WORK NOW FOR SPRING ITEMS

In the depth of the indoor season, popular projects are items for the spring. This is the season to work on window boxes and wagons for kids.

When working with old wood on such projects, sandpaper and clean the wood down to the grain. The clean grain will make the wood look like new when a thinned coat of fresh, white shellac is applied. When the shellac has dried, a second coat should follow.

A bright interior will also prove cheerful. Try touching up the wood in a closet and notice the difference. Sandpaper the bare wood down to a new surface and coat with the thinned shellac. Try it on the clothes hangers as well. It will give a dreary closet a new, inviting look. The attractive grain of wood, protected against dirt by the transparent shellac coat, is decoration enough in many cases.

*Note on thinning or reducing shellac:* Shellac usually is sold in 4 or 5 pound "cut" or strength. For practically all work, shellac should be thinned with good denatured alcohol; not antifreeze. Detailed instructions given in an 18-page, free booklet, "Shellac — How to Use It." — *Shellac Information Bureau, 51 Pine St., New York 5, N. Y.*

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## ASSOCIATION NEWS

(Continued from page 8A)

This year's plans include professional conferences and programs, commercial exhibits, and industrial arts demonstrations and displays.

Closed circuit television demonstrations will provide an Electronic Age innovation. The W. G. Brown Sound Equipment Company of Syracuse will bring a truckload of television equipment to the campus, and cameras will relay demonstrations from one point to outside monitors.

Dr. Hermann Cooper, executive dean for teacher education, State University of New York, will deliver the keynote speech during the conference, and Dr. Harvey Meyer, professor of industrial arts education, University of Florida, and Dr. John Brophy, chairman of the Department of Business Administration, University of Rochester, will deliver addresses.

Dr. Cooper's address will feature the opening general session in the college's main auditorium.

### GUIDANCE CONFERENCE AT STOUT STATE COLLEGE

Examining a display of guidance materials which attracted much attention among over 500 guidance experts from three states who attended a recent day-long conference on the campus of Stout State College, Menomonie, Wis., are students who aided in conference preparations, and Dr. Ralph G. Iverson, director of student personnel services at Stout and conference chairman.

### AMERICAN WELDING SOCIETY PLANS EXPOSITION AND MEETING

The American Welding Society, Inc., announces its forthcoming All-Welding and Allied Industry Exposition combined with 5-day technical meeting and informal panel discussion at St. Louis Kiel Auditorium, St. Louis, Mo., Monday through Friday, April 14-18, 1958.

The American Society of Mechanical Engineers will again co-operate with the AWS Technical Meetings. With the exception of one afternoon, when meetings are at the Auditorium, this group will hold its sessions at Hotel Statler which is AW headquarters.

This is the 39th Annual Meeting of the American Welding Society, and will feature papers and symposia by foremost welding authorities and engineers.

Exhibitors and others interested in full information on this show may write to *American Welding Society, Inc., 33 West 39th St., New York 18, N. Y.*

### NEW YORK STATE MEETING

The 24th annual convention of the New York State Vocational and practical arts Association will be held on April 10, 11, and 12, 1958, at Hotel Syracuse, Syracuse, N. Y. Guy Silvernail is in charge of commercial advertising.

A souvenir directory is being prepared and copies will be available to the Association's members, and to those attending the convention.

The officers of this group are: Ivan H. Griffin, president; Seelig Lester, vice-president; F. William Cunningham, treasurer; Reno Knouse, recording secretary; and John A. Storm, past president.

Stout State College students Joan Hobbick and Iris Friedman; also director of student personnel Dr. Ralph G. Iverson, and Stout student Andrew Kurey

Conference participants heard a talk by Walter F. Johnson, professor of guidance at Michigan State University, and president-elect of the American Personnel and Guidance Association. They also had a choice of 18 round tables devoted to special areas of guidance.

Present for the conference were workers in mental health and rehabilitation, guidance personnel, school administrations and teachers, and similar professional persons.

### IDAHO VOCATIONAL ASSOCIATION MEETING

The Idaho Vocational Association will meet at Idaho State College, Pocatello, Idaho, in the new Trades and Industry Building on June 9 to 13, 1958. The Association meeting will be held at the same time as the annual training session of all Idaho Vocational Teachers.

Jean Frick, Lewiston, Idaho, is president of I.V.A., and William Swenson, 610 Main St., Boise, is executive secretary.

Industrial arts teachers are invited to attend the A.V.A. meeting and vocational education conference. Thomas W. Matthews, Ricks College, Rexburg, Idaho, is state president of this latter group. — *George E. Denman, state director, vocational education.*

## PERSONAL NEWS

(Continued from page 10A)

He has served as an instructor in industrial education at the University of Minnesota.

William S. Hanks, assistant professor of elementary industrial arts, holds a B.S. and M.A. in education from Ball State College, Muncie, Ind. He has been a graduate assistant at Ball State and has taught in the Junior High School at Greencastle, Ind., and at Western Illinois State College. He is a U. S. Navy veteran.

John R. Pfund was appointed associate professor of industrial arts education. He received his B.S. and M.A. degrees from Kent State University, Kent, Ohio. Mr. Pfund has been a graduate assistant in ceramics and industrial arts for elementary teachers at Kent State. He has also served as an instructor in machine shop and general metals at the University of Illinois, and a teacher of Junior High School industrial arts in Champaign, Ill.

George V. Radcliffe, associate professor of industrial arts education, comes from Oswego, Ore., where he was a teacher of industrial arts and a vocational counselor. He earned his B.S. degree from Kearney (Nebr.) State Teachers College, and his M.A. from Texas A. & M. College. He has been a teacher and coach in the schools of Overton and Sidney, Nebr., Carrol, Iowa, and the University of Idaho. He is an Army Air Force veteran of World War II.

John M. Shemick, who holds B.A. and M.A. degrees from Michigan State University, has been appointed associate professor of industrial arts education. He has taught at Midland, Mich., Junior High School, and has been a graduate assistant and teacher at the University of Illinois. He served as assistant professor of education in the University School, University of Florida, Tallahassee.

John Somerville, assistant professor of industrial arts, holds B.S. and M.S. degrees from Oswego. He also attended Drexel Technical Institute in Philadelphia. For the past 14 years, he has been a co-operating teacher of industrial arts and assistant principal of New York Mills High School, New York Mills, N. Y.

Earle S. Spaar, associate professor of industrial arts, comes to Oswego from St. Johnsville Central School, where he was a co-operating teacher of industrial arts and director of adult education for eight years. He holds B.S. and M.S. degrees from State University Teachers College, Oswego. He is a member of the Committee of Research of the New York State Vocational and Practical Arts Association and the New York State Steering Committee for Industrial Arts.

### DR. HELTON IN PAKISTAN

After completing final requirements for the Ed.D. degree at Wayne State University, H. L. Helton, professor of industrial arts at Northeastern State College, Tahlequah, Okla., left on January 31, 1958, for Pakistan, where he will serve as teacher trainer and consultant to the principal at the Karachi Polytechnic Institute.

Dr. Helton's dissertation, "Evaluation in Industrial Arts Teacher Education," reports de-

(Continued on page 24A)

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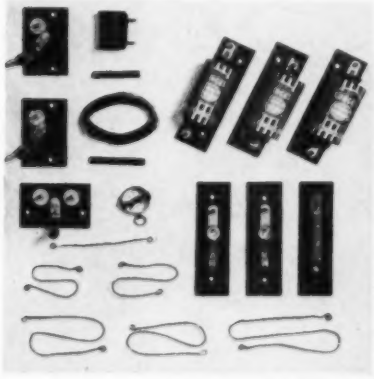

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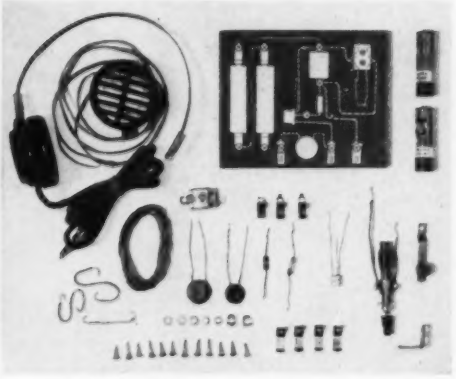

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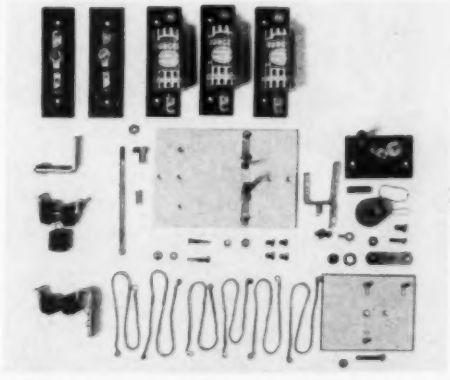
- Making a dry cell
- Changing alternating to direct current
- Conductivity of liquids
- Copper plating
- "Recharging" a dry cell



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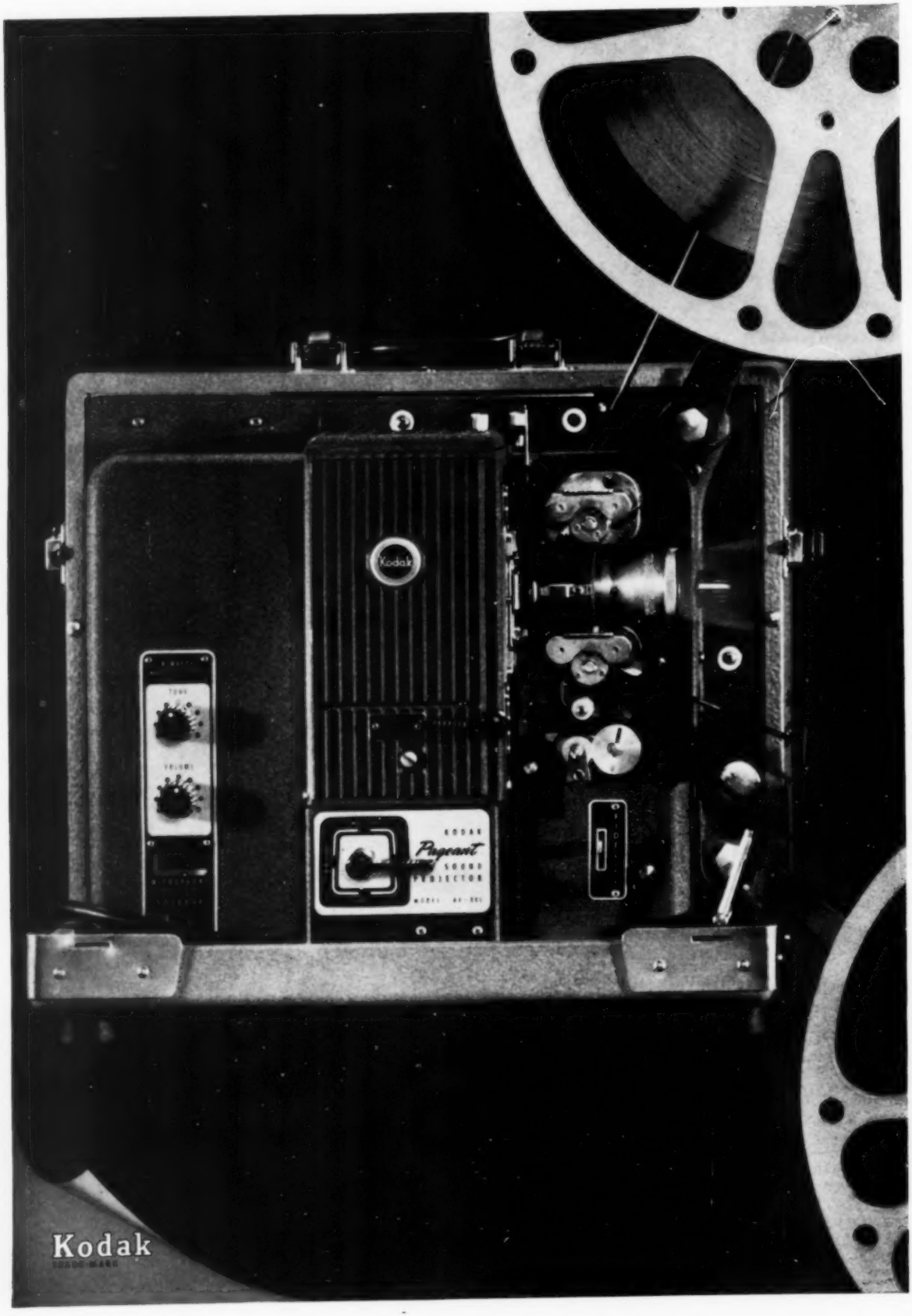
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## KODAK MAKES AUDIO-VISUAL NEWS

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The Model AV-085 has a new type of pull-down claw that's virtually wearproof, made of hard tungsten carbide. You'll have no problems with municipal electrical codes either—a new 3-wire cord provides for grounding, adapts to ungrounded outlets, too.

Ask your Kodak Audio-Visual dealer to demonstrate the new AV-085 Pageant. Or write for Bulletin V3-22 for full details. No obligation, of course.

**List price, subject to change without notice.*

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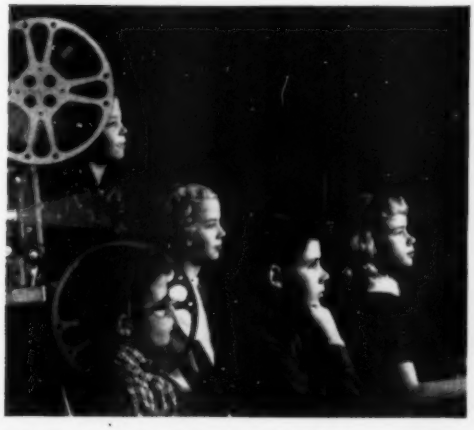
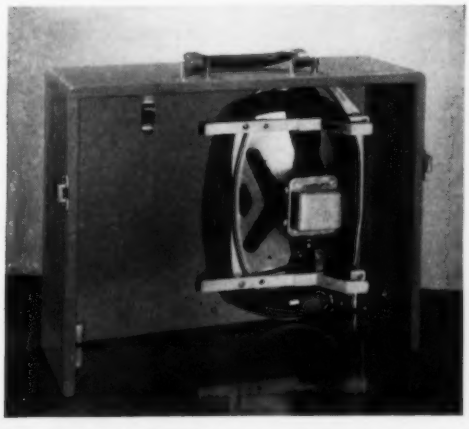


New low-cost Pageant Model AV-085 comes with economical 750-watt lamp, exclusive Kodak Super-40 Shutter for brilliant pictures on the screen.



Resonant, natural sound comes from new 11-inch *oval* speaker in baffled enclosure. Oval shape lends rigidity, makes case more compact.

## PERSONAL NEWS

(Continued from page 20A)

velopment of *Standards* and *Criteria* for accreditation of industrial arts teacher education programs. Working with co-operation from the National Committee on Accreditation of Industrial-Arts Teacher Education Programs (a committee established at the request of the National Council for Accreditation of Teacher Education), and the Evaluation Committee of the National Association of Industrial Teacher Educators, he prepared a detailed evaluation instrument designed to assist interested departments as they improve their programs of industrial-arts teacher education through self-study. In addition, a *Supplementary Guide* for industrial arts was prepared for the National Council for Accreditation of Teacher Education. Copies of the instrument and supplement appear in the *Seventh Yearbook* of the American Council on Industrial Arts Teacher Education.

Dr. H. L. Helton

While in Pakistan, Dr. Helton will be working with the staff from Oklahoma State University as they assist the development of technical education in that country. He expects to return to Northeastern State College from his leave of absence in December, 1959.

### HARLAN J. SHUFELT TO RETIRE

Harlan J. Shufelt, consultant in industrial arts, with the Board of Education, Racine, Wis., for 33 years, will retire at the end of this school year.

He was born at Kremmling, Colo., on January 14, 1893, and took his elementary and high school training at Boulder, Colo. He continued his education at the University of Colorado, the Colorado State College at Greeley, the Colorado State College at Fort Collins, the University of Southern California, Arizona State College at Flagstaff, Stout State College, Menomonie, Wis., and at the University of Wisconsin. He received his B.S., and M.S. degrees from the University of Wisconsin, and pursued his postgraduate study at the University of Southern California, Arizona State College, Stout State College, and the University of Wisconsin.

Harlan J. Shufelt
— Charles Studio, Racine, Wis.

Mr. Shufelt spent his years teaching at various places including, Berthoud, Colo., Boulder, Colo., the U. S. Army, and later at Pueblo, Colo., the University of Wisconsin, Iowa State College, Ames, the Racine Vocational School, and at the Racine public schools.

He is a life member of the American Vocational Association, and the Wisconsin Industrial Arts Association. He received the Laureate Citation of Epsilon Pi Tau.

Other educational offices filled by Mr. Shufelt are: president of the Racine Teachers Association; president of Wisconsin State Industrial Arts Association; president of Industrial Educators Supervisory Association; president of South East Wisconsin Industrial Arts Association; secretary-treasurer of Wisconsin State Industrial Arts Association; and consultant, industrial arts, Racine, Wis., since 1924.

Mr. Shufelt was active on a number of committees, and as a delegate to the National Education Association.

His contributions to educational literature include the following titles: "Responsibility of Industrial Arts in the Present Crisis," "Easily Available Illustrative Material for the Teaching of Woodworking," and "College Credit for the Teaching of Mechanical Drawing."

(Continued on page 26A)

SHELDON
CHICAGO U.S.A.

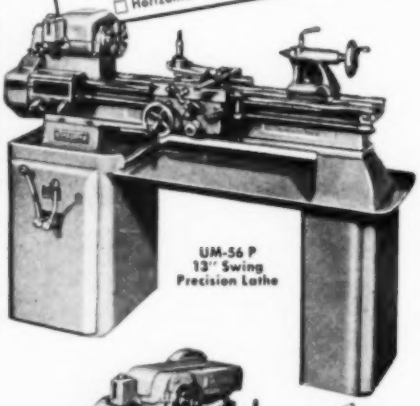
**Better Machine Tools for Teaching**
***. . . safer to operate, easy to learn on***

**For every school shop, laboratory and classroom . . . (from beginning classes in industrial arts and vocational education through advanced courses in trade schools and universities) . . . Sheldon builds a lathe to fit each academic, space and budget requirement.**

**Sheldon lathes are modern in design. With their easy-to-operate controls, students can learn basic lathe operations quickly and rapidly advance to practical shop projects.**

**From the largest 15" swing geared head lathe to the smallest 10" swing bench lathe, every Sheldon-built lathe meets the same rigid standards . . . standards that insure long life with minimum maintenance requirements in your school shop.**

SHELDON MACHINE CO., INC.
4244 North Knox Ave., Chicago 41, Ill
Gentlemen: Please add my name to your Shop Instructors mailing list:
Name ..... ☐ School ☐ Home
School .....
Street Address ..... Zone ..... State .....
City .....
PLEASE SEND ME YOUR NEW CATALOGS DESCRIBING
☐ 10" ☐ 11" ☐ 13" Sheldon Lathes
☐ 13" ☐ 15" Sebastian Geared Head Lathes
☐ Horizontal Milling Machine ☐ 12" Shaper

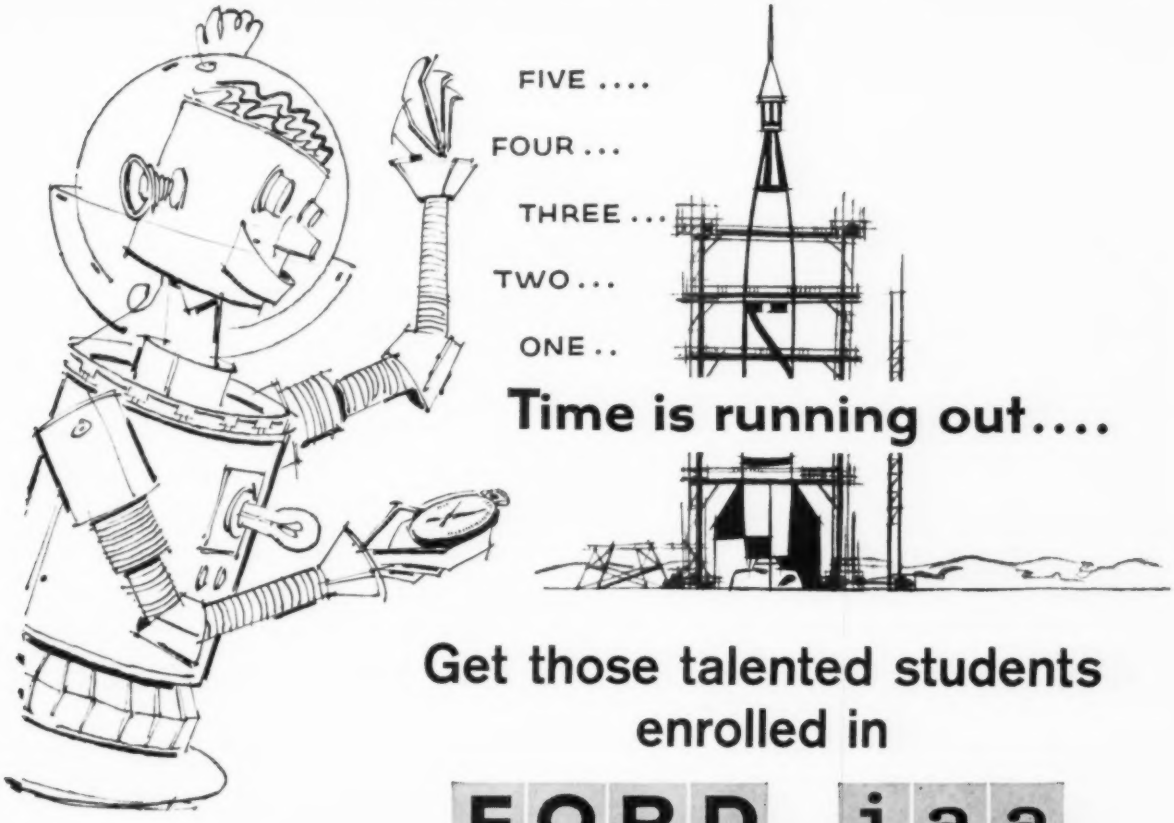


UM-56 P
13" Swing
Precision Lathe

No. L-46 Sheldon
10" Precision Lathe

Sheldon-Built
Sebastian 13" and 15" Geared Head
Precision Lathes

**SHELDON MACHINE CO., Inc.**
*Builders of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes.*
**4244 North Knox Avenue • Chicago 41, Illinois**




# Get those talented students enrolled in

# FORD iaa

# RIGHT NOW!

Through Ford's Industrial Arts Awards Program you and your students can get national recognition for industrial arts achievement!

Besides helping establish local exhibits for local projects, IAA offers students the opportunity to compete for cash prizes . . . awards 32 outstanding students *and their teachers* exciting expense-paid trips to Detroit–Motor Capital of the world.

Any high-quality industrial arts or industrial vocational project made by students in the 7th through 12th grades is eligible. Be sure to send attached coupon for entry blanks and complete rules booklet . . . do it before time runs out!

**ENTRIES MUST BE RECEIVED BY THESE DATES**

☆ **JUNE 10**

**Salt Lake City — for projects made in Montana, Wyoming, Colorado, New Mexico, and states further west**

☆ **JUNE 25**

**Dearborn, Michigan—for projects made in all other states**

INDUSTRIAL ARTS AWARDS FORD MOTOR COMPANY

## FORD INDUSTRIAL ARTS AWARDS, Dept. B

**FORD MOTOR COMPANY, The American Road, Dearborn, Michigan**

I would like to have the official IAA rules booklet and entry blanks. Please send to:

NAME_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Brown & Sharpe tools in the hands of a young machinist bring out his best work. They are long-lasting, easy-to-use tools of professional quality that will help him now and in the years ahead.

NEW B&S CONVERTIBLE THIMBLE MICROMETER
Friction Type, No. 1011

Converts to either "friction" or "fixed" type

Offers finger-tip, one-hand control

The new Brown & Sharpe Convertible Thimble Micrometer provides: (1) "Friction" action (friction sleeve slips on thimble when proper measuring pressure has been reached) . . . OR, converts to (2) "Fixed" type (sleeve locked to thimble) for the user who prefers to determine his own measuring pressure. A simple twist of a friction control nut sets the mike for either action.

Placement of the friction sleeve and a new lever-type lock make this an easy mike to use in one hand.

Other advantages: Floating lock does not affect spindle alignment; easy zero setting adjustment included; oblique barrel graduations and numbered, wide-spaced thimble divisions aid positive reading at all angles; carbide measuring faces assure long wear. Measures 0" to 1" in .0001".

Ask your local Brown & Sharpe distributor to show you this fine tool, or write for information. Brown & Sharpe Mfg. Co., Providence, R. I.

PROGRESS IN PRECISION FOR 125 YEARS

**Brown & Sharpe** BS

PRECISION TOOLS AND GAGES — MILLING, GRINDING AND SCREW MACHINES
CUTTERS — MACHINE TOOL ACCESSORIES — PUMPS AND HYDRAULIC PRODUCTS


## PERSONAL NEWS

(Continued from page 24A)

### N.Y.U. TEACHER ACTIVITIES

Dr. Kenneth R. Benson of the School of Education, New York University, New York City, was guest speaker at the Greater Montreal Boys Club Leadership Training Institute in September, 1957.

In addition, Dr. Benson brought a sample of contemporary popular arts and crafts media that were fashioned into projects for our Canadian neighbors. This display was set up and Dr. Benson conducted a panel discussion revolving around each of the finished projects.

While in Montreal, Dr. Benson visited the University of Montreal, McGill University, and St. Lawrence University. It is significant to note that industrial arts is still referred to as Sloyd and is principally woodwork.

On November 25, at 3:00 p.m., Dr. Benson was a member of a panel of two for a one-half hour radio program concerning the hobby possibilities and potentialities revolving around the problem of geriatrics (Harvest Years), which was sponsored by the Mayor's Committee of New York City on the problem of the aged.

Professor William P. Sears of the Department of Vocational Education, New York University, served as a consultant at the University of Puerto Rico during January to study and make recommendations concerning the Island's program for the selection and training of teachers of industrial subjects.

Mrs. Aram Heghinian (nee Elizabeth Trumbower), Department of Vocational Education, School of Education, has been promoted from instructor to assistant professor.

Professor Roland H. Spaulding, Department of Vocational Education, School of Education, New York University, was guest speaker at a Teachers Conference sponsored by the State of Nevada, Department of Education, Las Vegas, Nev., on October 10-11, 1957. His address was entitled "Learning from History."

On Thursday, November 7, Professor Spaulding was guest speaker at the Annual Teachers Convention in Atlantic City, N. J. He was the leader of a group of speakers at the clinic on air age education. The topic was "What's New in the Sciences." The clinic on air age education was sponsored by the New Jersey Curriculum Work Conference.

### OMER CARMICHAEL RECEIVES AWARD

Omer Carmichael, superintendent of schools, Louisville, Ky., was selected as the recipient of the seventh annual LaGuardia Award, it was announced by Newbold Morris, president of the LaGuardia Memorial Association.

Formal presentation of the scroll of honor took place at the annual luncheon of the LaGuardia Memorial Association at the Sheraton-Astor Hotel on Saturday, December 14, 1957, at 12:15 o'clock p.m.

The award has been made for "the outstanding success of Louisville in the accomplishment of desegregation in its public schools, as well as for the inspiration to many another southern community, a great deal of the credit properly being attributed to Omer Carmichael."

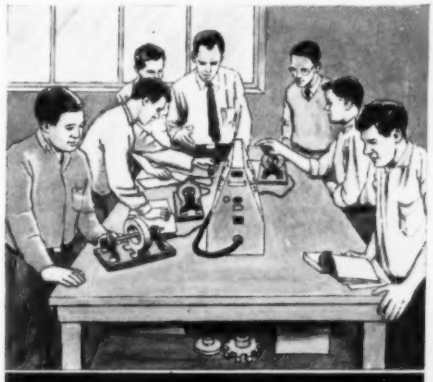
The selection of Mr. Carmichael was made by a special panel of judges annually chosen by the LaGuardia Memorial Association. The LaGuardia Award was presented in person by Mrs. Marie LaGuardia, widow of the late Mayor of the City of New York.

(Continued on page 28A)

## make any workbench an ELECTRICAL bench

with this NEW CROW

## 4-STATION Student Power Supply



Twin-faced unit can be used by as many as 8 students at a time

**model 620-R**

Input:
115V AC, 60 cycle
Outputs:
6 & 12V DC at 10 amps.
6, 12 & 24V AC at 10 amps.
26" x 10" • 51 lbs.

*write for bulletin*

**PORTABLE • RUGGED • COMPACT**

- The practical and economical way to convert any workbench to a low voltage AC and DC power supply.
- Ready to use in minutes—simply plug in to any standard AC outlet.
- Especially advantageous where benches must perform double duty.
- Four independent neon continuity lamps permit circuit tracing and trouble shooting.
- Six standard outlets for soldering irons, motors, lamps, etc.
- Lifetime 5-way binding posts accept all standard types of leads.
- Completely protected against overload by easily replaceable panel fuses.

CROW

**UNIVERSAL SCIENTIFIC COMPANY, INC.**

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MAYLINE

## Insist on Mayline For Your Classroom!

C7702 ART TABLE

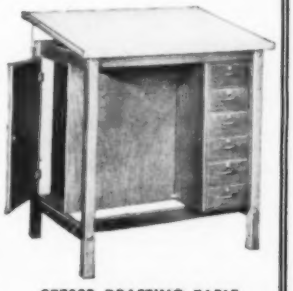
All Mayline tables have fine solid Basswood tops with Metal Edges. Legs, side and back rails, and drawers are oak, finished natural or golden oak.

C7703B drawers individually keyed; master keyed; shelves separate drawers. Unit holds six drawing boards 21" x 26" x ¾". Prices sent on request.

MAYLINE

MAYLINE

Symbol of MAYLINE Superiority

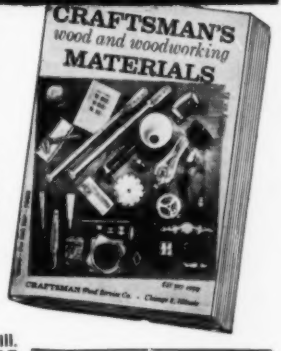


C7703B DRAFTING TABLE

**MAYLINE COMPANY**
**623 No. Commerce St.**
**Sheboygan, Wisconsin**

MAYLINE

## ALL NEW, COMPLETE CATALOG OF WOOD & WOODWORKING EQUIPMENT *FREE* TO INSTRUCTORS




***New 1958 Edition . . .***
**Finest Domestic and Rare Woods . . . Molding . . . Tools**
**ALL AT LOWEST PRICES**

INSTRUCTORS! Just mail coupon for your FREE COPY (25c to students, refundable with first order) of our giant new 1958 woodworking catalog. We are America's largest source of fine domestic and rare imported woods for projects. Also bandings, veneers, inlays . . . all shown in full color. Includes over 250 scroll patterns. See newest tools, equipment and hard-to-find cabinet hardware. Rush your request today!

**CRAFTSMAN WOOD SERVICE CO.**
**2729 Mary St., Dept. F-4, Chicago 8, Ill.**

CRAFTSMAN WOOD SERVICE COMPANY
2729 Mary St., Dept. F-4, Chicago 8, Ill.
Send new WOODWORKER'S HANDBOOK — FREE (enclose 25c if student, refundable with your first order).

Name .....

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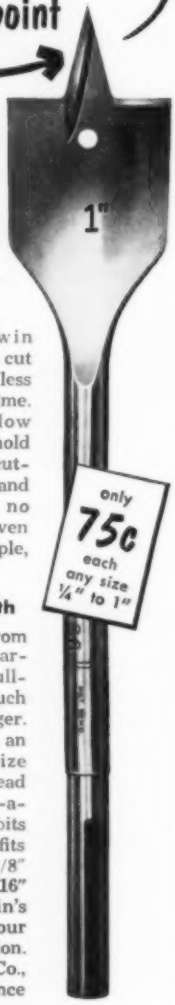
City ..... Zone ..... State .....

- 132 pages . . . many in full color . . . newest project ideas
- Embossed mouldings, carved ornaments, matched plywoods and veneers
- Complete lines of archery and upholstering supplies
- New! Blanks for baseball bats, snow skis, water skis
- New! Hardware for baby cribs, typewriters, folding legs
- Many new woodworking tools
- Same day shipment; guaranteed

NEW IRWIN BIT*

**SPEEDBOR "88"**

Exclusive hollow ground point




**steps-up efficiency of small ¼" electric drills**

School Shops using small ¼" electric drills and drill presses can now speed-up class work, increase the boring range of present equipment. New Irwin Speedbor "88" wood bits cut cleaner and deeper with less power and in less time. Irwin's exclusive hollow ground point takes hold faster, new spade-type cutters keep holes clean and accurate. No binding, no clogging, no wobble—even in seasoned hardrock maple, plywood, or plastics.

**Hardened Full Length**

Forged in one piece from solid bar of special high carbon steel and hardened full-length to stay sharp much longer, last much longer. Easily resharpened with an ordinary hand file. Size markings shown on head for easy selection. Hang-a-Bit hole lets you store bits on nail or pin. Shank fits perfectly in 1/4", 5/16", 3/8" and 1/2" chucks. Sizes 4/16" to 16/16". Include Irwin's new Speedbor "88" on your next purchase requisition. The Irwin Auger Bit Co., at Wilmington, Ohio, since 1885. *Patented

**SPEEDBOR "88" Sets**

Available in colorful red plastic roll kits. Individual pocket for each bit. Sets of 4, 6 or 11 bits store easily in tool chest or on shelf or work bench. As low as $3.00.

**Free Catalog No. 52.** Used by many School Shop Instructors as a handy reference and ordering guide. Shows auger bit types, sizes and recommended uses. Write Irwin, Dept. 4A, Wilmington, Ohio.

**IRWIN** the original solid center auger bit • screw drivers screw driver bits

## PERSONAL NEWS

(Continued from page 26A)

### BERRY AND OUTCALT ARE NEW INSTRUCTORS AT PURDUE

Robert H. Berry has joined the staff of the Department of Industrial Engineering at Purdue University, Lafayette, Ind., as instructor in electricity industrial controls, and electronic courses for industrial education students.

He received his B.S. degree from Ball State Teachers College, Muncie, Ind., in 1957. He served with New York Central Railroad Company for four years and in the Air Force for four years as instructor and electronic technician. He is past vice-president of Epsilon Pi Tau, and a member of Kappa Delta Pi.

Richard M. Outcalt has accepted a position as instructor in the machine tool laboratory of the Department of Industrial Engineering at Purdue University.

He is a graduate of Butler University with a B.S. degree, and Indiana University with an M.S. degree, and was formerly a teacher of machine shop at Martinsville High School, Martinsville, Ind.

Mr. Outcalt also held positions with Hamblen Gage Corporation, Chrysler Corporation, and Naval Ordnance Plant.

### LOUIS DERBY RECEIVES APPOINTMENT

Louis Derby has been appointed assistant co-ordinator of the evening trade extension classes at the Minneapolis Vocational High School and Technical Institute.

He is a graduate of Mankato State College. After completion of college Mr. Derby taught vocational machine shop from 1951 to 1956 at Sioux Falls, S. Dak. During that time he earned a master's degree from the University of South Dakota.

After leaving Sioux Falls he taught junior high industrial arts for one year at Richfield, Minn., a suburb of Minneapolis, from which he went to Minneapolis Vocational School.

♦ Marvin G. Burroughs joined the staff of the Division of Industrial Arts, Northern State Teachers College, Aberdeen, S. Dak., beginning with the fall quarter, September, 1957.

He took one year of the industrial-arts work at Northern State Teachers College, and earned the B.S. in industrial education at State Normal and Industrial College, Ellendale, N. Dak.; and the M.E. in industrial arts at Colorado State University, Fort Collins.

Mr. Burroughs comes to Northern from Pierre, S. Dak., where he was instructor and director of industrial arts.

♦ William D. Perkins has been appointed manager of public relations at Illinois Institute of Technology, Chicago, Ill., it was announced by Dr. John T. Rettaliata, president.

He will be in charge of public relations for Illinois Tech and its affiliates, the Armour Research Foundation, and the Institute of Gas Technology.

Formerly, Mr. Perkins was an associate editor of *Popular Mechanics* magazine and Westinghouse Electric Corporation regional manager of public relations, Chicago.

♦ Dr. Owen Harlan has returned to the University of the State of New York's College for Teachers at Buffalo, after two years of service as Consultant to the Department of Education of the Union of Burma. There his primary responsibility was to help in the development of a teacher-training program at the State Training College for Teachers in Rangoon. Supervisory duties, however, carried him to all parts of Burma and led to inspection trips to Hong Kong and Bangkok.

picked by professionals

Reach for a Venus drawing pencil and get the sharper, clearer line (in all 17 degrees of hardness) your work demands. Venus homogenized lead holds a needle point longer, insures uniform smoothness, perfect smudge-free work. Pressure proofing seals the lead to the wood along its full length so the Venus is stronger. Prove Venus superiority for yourself. *Send for the educational brochure "Atomic Energy and You" and get a FREE Venus Drawing Pencil.*

VENUS® drawing pencils

VENUS PEN & PENCIL CORPORATION, HOBOKEN, N. J.

# News Notes

## FORD INDUSTRIAL ARTS AWARDS PROGRAM

Ford Motor Company is distributing more than 40,000 individual entry blanks to industrial arts and technical educators for the company's 1958 Industrial Arts Awards and Student Craftsman's Fair program.

The nationwide Industrial Arts Awards program, which attracted more than 35,000 entries last year, is designed to encourage pride of craftsmanship and creative imagination among students enrolled in junior, senior, and technical high schools.

Ford Motor Company, now in its ninth year as IAA sponsor, has posted $50,000 for awards to teen-age craftsmen in 1958. Included are 32 grand awards which will bring winners and their instructors to Dearborn, Mich., for three-day, expense-paid holidays.

Winners of 738 cash awards, as well as 864 place winners, will be announced in July after final judging by a panel of leading educational and industrial specialists.

After the judging, winning entries will be displayed in various parts of the country, including Dearborn.

The 1958 competition is divided into 14 divisions — mechanical drawing, woodworking, electrical, graphic arts, leather, ceramics, jewelry, models, wrought metal, patternmaking and molding, plastics, machine shop, architectural drawing, and an open division.

Competition is open to students under 21 in any public, private, or parochial school. Further information, as well as rule books and entry blanks, may be had by writing to: *Industrial Arts Awards, Ford Motor Company, The American Road, Dearborn, Mich.*

## NATIONAL INDUSTRIAL ARTS SCHOLARSHIP FUND

The Industrial Arts Division of the American Vocational Association, under the leadership of William R. Mason, supervisor of industrial arts, Cleveland, Ohio, and A.V.A. vice-president for industrial arts, has established a National Industrial Arts Scholarship Fund. The Scholarship Fund has been started through initial contributions by several leading school shop supply and equipment firms. Additional contributions are needed and it is hoped many more donors will assist financially.

Scholarships ranging up to $500 will be awarded to outstanding young men for the purpose of entering industrial-arts teacher education. It is hoped that these scholarships will help alleviate the industrial-arts teacher shortage and enable promising young men, who are not otherwise financially able to do so, to enter industrial-arts teacher education.

Selection of scholarship winners will be done through a national testing service after initial screening by the A.V.A. Industrial Arts Scholarship Committee.

Committee members are: Dr. Kermit Seefeld, University of California, Santa Barbara; Dewey F. Barich, Ford Motor Company, Dearborn, Mich. (recently appointed president of Detroit Institute of Technology); Dr. Robert Thompson, New York University; and Robert M. Worthington, Washington Senior High School, St. Paul, Minn. Mr. Worthington is committee chairman.

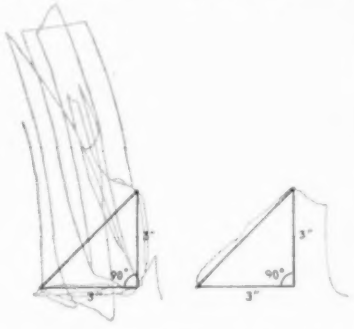
Application blanks and additional information may be obtained from committee members or from the *American Vocational Association, 1010 Vermont Avenue, N.W., Washington 5, D. C.*

(Continued on next page)

# DRAFTING TIPS

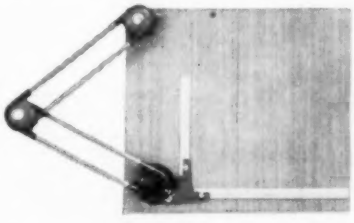
## An example of drafting machine efficiency

The diagram below is a pantographic study of the right hand motion required to draw it. The top figure was drawn with T-square, triangles and scales . . . while the bottom figure was drawn with a drafting machine. In this example the drafting machine reduces hand motion from 20.78 feet to 3,12 feet. The number of distinct right hand motions is cut from 28 to 6.




## A drafting machine designed for instructional use

Because of widespread use of drafting machines in industry, it becomes increasingly important that mechanical drawing students be properly instructed in their operation. The Desk-Topper drafting machine is especially suited for school use. Though this completely portable unit is low in cost, it delivers professional accuracy and long service life.



Many teachers have found that drafting machines help to develop a professional attitude among the students. Faster, neater work is the result in most cases.

The Desk-Topper, equipped with C clamps, is very easy to mount or remove from the student's drawing table. The mounting bracket adjusts up and down so that a drawing board

will fit perfectly under the machine. This feature permits layout work on materials of all thicknesses up to ¾". The drawing capacity of the Desk-Topper is 24" x 36". The Desk-Topper is also available complete with a board that folds compactly for safe, convenient storage in drawing table drawers or lockers.

Other important Desk-Topper features include: a full-size protractor with automatic 15° index control button, a full base-line selector, elbow height adjustment, fully enclosed band and pulley arms, and built-in brakes for 10° board slope. In learning to operate the Desk-Topper, your students will be prepared to use a standard drafting machine in industry.

Using the Desk-Topper drafting machine in mechanical drawing classes requires no change in your text or the problems you teach. *For full information on this unit, write The Educational Sales Division, Frederick Post Company, 3648 N. Avondale Ave., Chicago 18, Illinois.*

POST

SENSITIZED PAPERS & CLOTHS • TRACING & DRAWING MEDIUMS • DRAWING INSTRUMENTS & SLIDE RULES
ENGINEERING EQUIPMENT & DRAFTING SUPPLIES • FIELD EQUIPMENT & DRAFTING FURNITURE

## NEWS NOTES

(Continued from previous page)

Individuals or firms wishing to contribute should make checks payable to the National Industrial Arts Scholarship Fund. Checks should be mailed to Robert M. Worthington, Washington Senior High School, 1041 Marion Ave., St. Paul 3, Minn.

### SPRING CONFERENCE PLANNED

The Vocational Education Department and the Art Department of the School of Education of New York University announce a jointly sponsored Spring Conference entitled "A Positive Approach to Problems of Art and Industrial Arts."

The Conference will take place on Saturday, March, 22, 1958, in La Guardia Hall from 10:00 a.m., to 5:00 p.m.

The objectives of the conference will be to explore areas of common interest to art and industrial arts in philosophy, content, and application, in order to help clarify possible courses of action for the exploitation of these areas in the interest of better education.

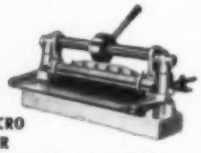
Further information may be obtained by writing to the *Department Chairman, Spring Conference, Department of Vocational Education, School of Education, New York University, Washington Square, New York 3, N. Y.*


NEW SPARTAN MODEL 24
A DI-ACRO BOX AND PAN BRAKE

FORMS BOXES AND CHASSIS WITH UP TO ½" FLANGE

The Spartan's new design and rugged construction was planned specifically for school shops. Hardened Box Fingers are undercut to allow the forming of chassis and boxes as deep as 3" with lipped edges as large as ½" across. Material clearance of 1" between the Box Fingers and the Bottom Plate allows for easy insertion and removal of material. The Spartan bends 16 gauge mild steel up to 135° in one operation. It can also be used as a radius former and bar folder. An adjustable back gauge and a simplified stop control are standard equipment, *available in 24" width only.*

SPARTAN MODEL DI-ACRO ROLLER
Built exclusively for school shops in five widths, 12" to 36", all with 2" machined rolls. Form smooth cylinders with radii of 1" and larger in sheet metals up to 16 gauge. Heavy welded steel and cast construction.



DI-ACRO SHEAR
An industrial tool available to schools in 6", 9", 12" and 24" widths. Capacity 16 gauge steel.

DI-ACRO BENDER
Available in five sizes that form bar stock, flats and tubing in a minimum of change-over time.

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### PROFESSIONAL CERAMIC EXHIBIT

Ceramic Leagues Inc., has completed plans to conduct a Professional Ceramic Exhibit, as a new feature of their Eastern Ceramic Hobby Show to be held in Asbury Park, N. J., May 8 through 11, 1958.

A uniform card will identify each entry, giving the name and complete address of the party, or firm, submitting the entry together with pertinent information, intended to add interest to each piece exhibited. Any of the professionals entering their work and desiring to place the entry on sale may do so by stating the selling price. However, none of the purchased items may be delivered to the buyer until the close of the show.

It is hoped that through the media of this professional exhibit, many of the hobbyists will be able to get the special information they are looking for.

Applications for rules and entry forms will be available. Those desiring to reserve space should write to *Middleton Ceramic Studio, 419 Rutgers Ave., Hillside, N. J., % Chairman of Professional Ceramic Exhibit.* A Certificate of Merit will be awarded to each entry accepted.

### CONFERENCE ON WOOD RESEARCH PLANNED

The new, ultra modern Hugh P. Baker Memorial Wood Products Laboratory building of the State University College of Forestry at Syracuse University will be the focal point of a two-day conference on basic and applied wood research, to be held March 30 to April 1, 1958, in Syracuse, N. Y.

The professional parley, international in character, will be jointly sponsored by the Wood Industries Division of The American Society of Mechanical Engineers (ASME), in co-operation with The Syracuse Section, ASME, and the Eastern Canadian Section and Northeast Section of the Forest Products Research Society.

Conference headquarters will be the Hotel Syracuse. All technical sessions, as well as the banquet, will be held at the hotel.

Several hundred persons, from various parts of the United States and Canada, are expected to attend. Most of them are either actively engaged in research, or else are interested in applied wood technology.

As one of the major highlights of the meeting, recent pictures of Russia's forest industries will be shown by Col. J. H. Jenkins, Chief of the Canadian Forest Products Laboratory.

Technical papers and reports will be presented on: laminated structures, particle board, wood-particle molding, new abrasives, performance of circular saws, moisture movement in wood, and many others.

The four-story, L-shaped Hugh P. Baker Memorial Wood Products Laboratory building at Syracuse was completed in May, 1957, at a cost of nearly $4 million. The structure was designed solely for education and research in wood.

### NEW PROFESSIONAL UNITS AT UNIVERSITY OF ROCHESTER

The University of Rochester, Rochester, N. Y., recently announced a major reorganization of its academic and administrative structure with the establishment of three new professional education units at its River Campus, effective September 1, 1958. They are:

A College of Engineering, combining the long-established Departments of Chemical and Mechanical Engineering, and the new Department of Electrical Engineering.

A College of Education, comprised of the former Divisions of Education and Nursing Education.

(Continued on page 32A)

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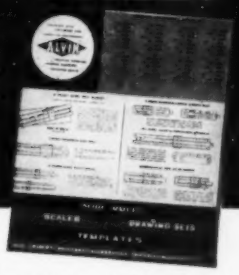

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## NEWS NOTES

(Continued from page 30A)

A School of Business Administration, hitherto the Department of Business Administration.

Each will have its own dean or director and administrative staff and will have the full freedom of action necessary to its best professional development, according to Dr. Cornelis W. de Kiewiet, president of the University. He termed the reorganization the most significant academic development at the University since the opening of its Eastman School of Music in 1921 and of the School of Medicine and Dentistry in 1925.

The new autonomous colleges and school bring to a total of six the number of separate schools and colleges at the River Campus, including the College of Arts and Science, founded in 1850, University School of Liberal and Applied Studies, and the Institute of Optics.

Dr. William A. Fullagar, chairman of the present Division of Education, has been appointed dean of the College of Education, and Dr. John Brophy, chairman of the Department of Business Administration, has been named director of the School of Business Administration. The selection of a dean of the College of Engineering will be announced later.

### "MY POP'S A LINEMAN"

Premiere performance of the new sound, color movie on electrical safety, "My Pop's A Lineman," a combined project of the Wisconsin Rural Electric Job Training and Safety Committee and Stout State College, took place during a luncheon meeting of the Menomonie, Wis., Rotary Club at noon on Wednesday, October 30.

In addition to Rotary members, also present were representatives from Northern States Power Company, and the Wisconsin State Traffic Patrol, two other organizations co-operating in the production of the movie, as well as REA personnel from this area, and faculty members and students from Stout who helped create the film.

The picture is designed for use by REA co-operatives and all electrical suppliers, public school systems, film rental libraries, and for television showings. The new film also will permit REA safety officials to show more easily an electrical demonstration which during the past 10 years they set up throughout Wisconsin for over 100,000 spectators.

The project also provided for Stout State College the opportunity, without use of tax funds, to teach its students in the audio-visual center the actual techniques of creating a sound, color movie.

## *New Publications*

### Heirloom Furniture

By Franklin H. Gottshall. Cloth, 154 pp., 8⅞ by 11⅞ in., illus., $9.50. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

The author of this book has written a number of excellent books on furniture making and design. This new book is as good as its predecessors, and the numerous examples of heirlooms chosen by the author for this book will be greatly admired by all lovers of fine old furniture.

The book contains half tones of each piece as well as carefully made line working drawings which can be followed in making replicas of the pieces shown.

(Continued on page 34A)

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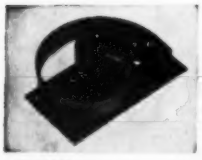

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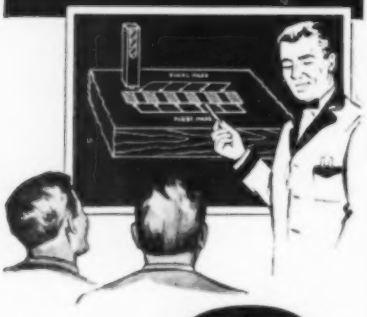

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## NEW PUBLICATIONS

(Continued from page 32A)

The pieces illustrated and described are: two fine examples of corner cupboards; a Hepplewhite dining-room suite dining table, dining room sideboard, side chair and armchair; Welsh dresser; Chippendale lowboy; Colonial ladder-back chairs; turned trestle table and Colonial hanging wall shelf; butterfly table; light Sheraton side chair; Hepplewhite child's rocker; Colonial mirror; early Georgian slant-top desk; Governor Winthrop secretary; Duncan Phyfe roll-top desk; spinet desk; early American flat-top office desk; Chippendale wing chair; piecrust table; Sheraton-type grandfather's clock; William and Mary dressing table, mirror and stool; four-poster beds; Queen Anne highboy; Jacobean chest of drawers; paneled cedar chests; and furniture finishing.

### Pioneering in Industrial Research

By Kendall Birr. Cloth, 204 pp., 6¼ by 9¼ in., $4.50. Public Affairs Press, Washington, D. C.

The use of science in industry grew slowly. As a matter of fact there was considerable resistance and prejudice against trained men.

Men like Eli Whitney, Oliver Evans, Robert Fulton, Samuel Morse, Alexander Graham Bell, and Charles Goodyear were men of little scientific training. As time advanced, however, there were more inventions which were produced and exploited by trained men.

This finally convinced businessmen and industrialists of the value of science.

The book is exceedingly interesting and tells the story of the success of General Electric Research Laboratory in a very interesting manner.

### Projects for Metals

By John R. Walker. Paper, 80 pp., 8½ by 11 in., illus., $1.75. The Goodheart-Willcox Co., Inc., Chicago, Ill.

This book contains 46 projects all of which will arouse student interest.

The making of these items will give the student opportunity to work at the lathe, cut threads, use measuring instruments, do tapping, use the drill press and the dividing head, get experience in the foundry, do patternmaking, and get acquainted with rules of shop safety.

Some of the projects described are a hack saw, center finder, automatic center punch, scriber, inside and outside calipers, screw driver, punches, drill gauge, ball-peen hammer, drill chuck tap handle, live center, lathe dog, try square, drill press vise, universal cross slide, modelmakers vise, milling attachment, drill press, polishing head, jigs and fixtures, disk sander, door knocker, meat tenderizer, candlestick holders, wall candelabra, serving cart, end table, phonograph cart, telephone stand, salt and pepper shaker, table lamp, airplane stamp, picture frame clamp, naval truck gun, weather vane, paperweight, nut cracker, and miniature engine.

### Leatherwork Procedure and Designs

By Willey P. Klingensmith. Cloth, 136 pp., 7⅛ by 10 5/16 in., illus., $3.50. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

A fine text for those who want to learn how to do leatherworking. The book gives the learner a history of leather, describes the tanning process and the sources from which leather may be obtained. Then it gives advice on how to purchase leathers and describes the various kinds of leathers and how to cut and prepare them for making the different kinds of projects. It also shows how to lace, braid,


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Chapter 4 gives directions for making 32 different kinds of articles out of leather. All of the projects are clearly and fully described, and even the beginner should have little trouble in following the description and the fine illustrations.

### Principles of Electrical Measurements

By H. Buckingham and E. M. Price. Cloth, 600 pp., 5⅞ by 8¾ in., illus., $15. Philosophical Library, Inc., New York, N. Y.

The material of this book has been prepared by men who not only know what is needed in their field, but also what is required by those who have to be leaders and followers in the field — the practical engineers, who need to know a great deal about the increasing uses now made of electricity, the teachers of those who want to enter this expanding field of practical electricity, and the men who are now working on the technical applications on the manufacturing and supply sides of this industry.

The subject matter of the book embraces clear explanations of deflectional instruments; deflectional methods; potentiometer measurements; systems, dimensions, and standards; bridge methods; oscillations and vibrations; methods using thermionic valves; resonance and heterodyne methods; power system measurements; integrating meters; instrument transformers; magnetic measurements; and measurement of some nonelectrical quantities.

## *Business and Personal News*

### BLACK & DECKER TRAINING CLASSES

A recent Black & Decker training class for industrial-automotive division salesmen included members from the electric tool company's sales force in the Caribbean, and from Atlanta, Des Moines, Chicago, Memphis, Los Angeles, and Seattle. Black & Decker holds two-week training classes regularly to acquaint new men from all over the world with company products and background.

Listed among the last group are: Claude Rutledge, Atlanta; Stan Gustafson, Des Moines; Dean Smith, Los Angeles; Jim Parker, Chicago; Ed Van Horn, Seattle; Rene Grimany, Caribbean; and Jim Carlson, Memphis. Training instructors were Harry Shackelford, Lew Hill, and Alex Dahl.

### BROWN & SHARPE ANNOUNCES NEW ORGANIZATIONAL UNIT

Formation of a new organizational unit, to be named the Hydraulics Division of the Brown & Sharpe Mfg. Co., was announced recently by Henry D. Sharpe, Jr., president of the company.

The new division combines three previously independent business activities — Brown & Sharpe's former Hydraulic Products Division, located in Providence, R. I.; the Double A Products Co., located in Manchester, Mich.; and the power unit portion of the Rosaen Company of Hazel Park, Mich.

The new operation will be headed by Herbert H. Upton, serving as its general manager, and reporting directly to the president of Brown & Sharpe. Mr. Upton also continues in his former capacity as president of the Double A Products Company.

(Continued on next page)

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## BUSINESS & PERSONAL NEWS

(Continued from previous page)

### FORD MOTOR COMPANY REPRESENTATIVE RECEIVES AWARD

As the representative of business and industry, James J. Nance, Ford Motor Company vice-president in charge of Mercury, Edsel, Lincoln, and Continental cars and English Ford products, was one of five native Ohioans to receive the Governor's Award — the highest honor given by the state of Ohio.

The awards were presented at the annual Ohio Newspaper Association banquet in the Deshler-Hilton Hotel, Columbus, Ohio, on February 7, 1958. The presentation was made by Mrs. Betty O'Neill, wife of Governor C. William O'Neill who is recovering from a heart attack.

Mr. Nance was honored for his outstanding accomplishments in business and industry.

### BLACK & DECKER ANNOUNCES NEW OFFICERS

Election of J. Early Hardesty to vice-president-treasurer, and George W. McCarty to vice-president-research and development of The Black & Decker Manufacturing Company was announced by Robert D. Black, chairman of the board, and president. The appointments were made by the electric tool company's Board of Directors during their annual meeting on January 27, 1958.

Prior to their promotions, Mr. Hardesty was treasurer, and Mr. McCarty was chief engineer of Black & Decker.

The Black & Decker executive organization includes three other vice-presidents in addition to an executive vice-president.

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## *Descriptive Material*

### NEW LINCOLN WELDIRECTORY

How to select the most efficient electrode for any particular welding job is the subject of a new 12-page weldirectory published by The Lincoln Electric Company.

While there are usually several types of electrodes that will weld any job, there is always one type that does the best job at the lowest cost. To help select the best electrode for overhead, downhand, sheet metal or other work, the Weldirectory first describes the basic characteristics of each family of electrodes. This description includes deposition, arc action, amount of slag, bead appearance, and general applications. Then the Weldirectory clearly differentiates between individual electrodes within the family and gives physical properties, current ranges, sizes, and welding procedures for each electrode.

The back of the Weldirectory is a wall chart containing frequently used information about Lincoln electrodes. The Weldirectory is available free on request from The Lincoln Electric Company.

**(For further details encircle index code 0412)**

### NEW PROJECT PACKETS ANNOUNCED

O'Neil-Irwin Manufacturing Company, creators of the Di-Acro System of Die-Less Duplicating, have made available three project packets — "Contemporary Sheetmetal Projects" for beginning metalworkers; "Suggestions in Wrought Iron for the Modern Home" and "Contemporary Metal Home Furnishings" for more advanced students. These project packets are available free of charge.

Di-Acro brakes, shears, notchers, rollers, and benders form a basic combination of metalworking machines that will be of greatest value in the industrial-arts department. Those schools and vocational departments giving broad emphasis to the metalworking area will find the more specialized machines such as the punch presses, press brakes, rod parters, and spring winders of interest.

Write for a copy of the Specifications Sheet for Di-Acro Equipment in the School Shop. It contains complete information on Di-Acro equipment most applicable to school shops.

**(For further details encircle index code 0413)**

### MANAGING THE HIGH SCHOOL CAMERA CLUB

A new booklet, available from Eastman Kodak Company, is entitled "Managing the High School Camera Club." It is intended for school principals and guidance counselors.

Among subjects discussed in the eight-page brochure are how clubs get started, the club and the school, membership, plan of operation, how to set up a constitution, who should be the club's officers, the physical setup, the school camera, and outside resources necessary.

When writing for your copy ask for Publication No. T-50.

**(For further details encircle index code 0414)**

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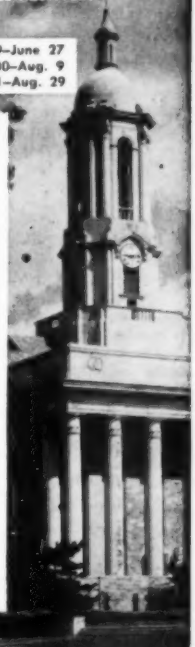

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DEPARTMENT OF INDUSTRIAL EDUCATION

SUMMER SESSION
JUNE 23-AUGUST 15, 1958

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**NOTE: Please write direct to school.**

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OREGON STATE COLLEGE
Dept. C8 · Corvallis, Oregon

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Announces the 1958 Summer Session

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MACHINE DRAFTING AND DESIGN
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Six semester hours credit may be earned in each of the five-week sessions.

First Term, June 16—July 19
Second Term, July 21—August 23

**For additional information write Director of Summer Session, Bradley University, Peoria, Illinois**



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Excellent Low-Cost Housing.

***Send Now for Summer Session Bulletin***
***Director of Summer Session***

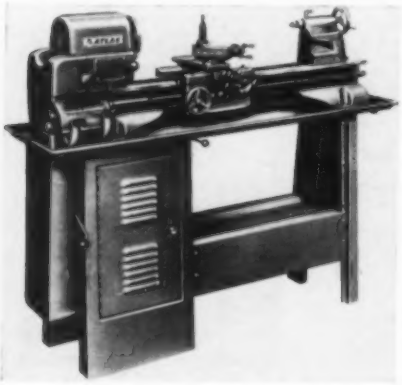
**Stout State College Menomonie, Wis.**

# Shop Equipment News

## NEW ATLAS 12-IN. LATHE

Atlas Press Company, manufacturers of small, low-cost precision machine tools, announces the new Atlas 12-in., back-geared screw-cutting lathes which are low in cost — both initial and operating.

They are rugged, accurate, and powerful. They have a 12½-in. swing over the bed, 12-in. swing over saddle wings, 8 in. over cross slide, and up to 36 in., between centers. They have a new massive headstock and tailstock, and new heavy-duty bed and carriage. The spindle turns on Timken tapered roller bearings that insure long accuracy life, permit high spindle-speed work as well as turning at normal speeds. Tops, sides, and bottoms of bed ways are precision ground to close tolerance, and headstock, carriage, and tailstock are hand fitted to the bed.



Atlas 12-in. Lathe

Other efficiency features include 16-spindle speeds, complete V-belt drive, power cross and longitudinal feeds, wide feed and thread cutting range.

Atlas 12-inch lathes are available in pedestal base models with totally enclosed underneath drive with two V belts turning the spindle, and in bench models with completely guarded horizontal bench-mounted countershaft.

Full information, and illustrated catalog are available.

**(For further details encircle index code 0401)**

## NEW IMPROVED IMPACT WRENCH

Millers Falls Company is introducing a new Model No. 777 Electric Impact Wrench incorporating many refinements and improvements. It is a successor to the popular No. 555.

With rated capacity for running and removing nuts on bolts up to ⅜ in (⅝ in. under favorable conditions), it is ideally suited for automobile mechanics, service and maintenance men. In addition, it fits the requirements for a wide variety of assembly and other applications in industry. It has a ½-in. square drive, produces 2000 impacts per minute, and develops 100 ft. lb. torque.

New Millers Falls No. 777 Impact Wrench

Major improvements include beryllium copper contacts and terminals, unit thrust bearings both for spring and impact mechanism, chrome alloy steel balls and larger planet gear pins in a new, three-planet system.

Full power in either direction is achieved by brushes which automatically shift as the reversing switch is turned.

Weighing only 7¼ lb., the No. 777 Impact Wrench has excellent balance and is easily controlled with one hand. Besides running and removing nuts, bolts and studs, it performs many other jobs such as tapping, threading and rethreading, drilling metal, wood and masonry, reaming, and operating hole saws.

Hex and square sockets for the No. 777 are

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**WAYNE STATE UNIVERSITY**

***1958 Summer Session Beginning June 23 for Six, Eight, or Ten Weeks***

**FEATURING:**

PLASTICS — Design of plastic projects; Analysis of operations and demonstrations.

HYDRAULICS — Curriculum materials and basic instruction for drafting and other technical teachers.

ADMINISTRATIVE AND SUPERVISORY FUNCTIONS OF VOCATIONAL EDUCATION

LEGAL AND INDUSTRIAL RELATIONS ASPECTS OF VOCATIONAL EDUCATION

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RESEARCH PROCEDURES — Research in and for industrial or vocational education

PHILOSOPHY AND TRENDS IN VOCATIONAL AND PRACTICAL ARTS EDUCATION

August 4-15 TERMINAL VOCATIONAL PROGRAMS IN COMMUNITY COLLEGES.

August 18-29 INSTITUTE FOR TRADE AND TECHNICAL TEACHERS OF RADIO, ELECTRONICS, AND TELEVISION.

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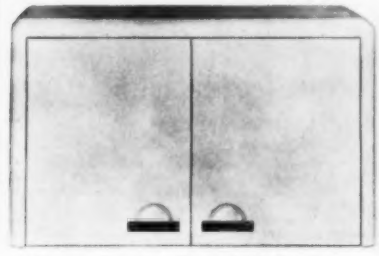
**Director of Summer Session**
**State University Teachers College**
**Oswego, New York**

supplied in a broad range of sizes. Adaptors, chucks, and many other accessories also are available.

**(For further details encircle index code 0402)**

## SPACE-SAVING FIRST AID STATION

General Scientific Equipment Company have announced a new first aid wall-mounting cabinet small enough to mount close to hazardous areas, yet large enough to hold all necessary first aid items. The cabinet is especially useful where fast, immediate first aid treatment must be given — as with caustic burns of the eyes and skin — to prevent serious organic injury.



Space-Saving First Aid Station

Each of the cabinet's two doors is fitted with a positive-action catch that cannot open as a result of nearby vibration, making the unit ideal for plant use even in difficult locations. Other important safety features are rounded-corner construction and flush chrome hardware.

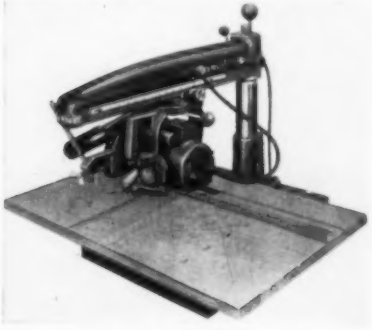
Finished in durable white, baked-on enamel, dimensions are: 20 in. high, 24 in. wide, and 11 in. deep.

The cabinet may be purchased completely stocked with first aid supplies, at an additional cost.

**(For further details encircle index code 0403)**

## DeWALT POWER SHOP OFFERS NEW ACCURACY FEATURE

All the new AMF DeWalt Power Shop machines now being manufactured are equipped with exclusively-designed steel inserts at commonly used 0, 45-deg., and 90-deg. locating points, as announced by Conde Hamlin, president, DeWalt Division, American Machine & Foundry Company.



DeWalt Power Shop with New Feature

Before this new design, the steel pins fit locator holes drilled in the aluminum yoke casting. Electrolytic action between these two different metals eventually created wear in the softer aluminum metal, causing distortion in

(Continued on next page)

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**COLOR TV TRAINING MANUAL**

For advanced students. Covers principles of the Color TV system, including colorimetry, make-up of the color signal; Color receiver circuits (chapters on every type of circuit used in the receiver); Color receiver servicing, including setting up the Color picture tube, alignment, trouble-shooting, test equipment required; also valuable appendices containing equations, vectors, color blocks and colorplates. A comprehensive Color TV training course. 260 pages; 8½ x 11"; profusely illustrated. Order *TVC-1*, only **$6.95**

**PHOTOFACT TELEVISION COURSE**

A complete, simple explanation of modern Television principles, operation and practice. Covers Cathode Beam Formation and Control; Beam Deflection Systems; Beam Modulation and Synchronization. Includes analysis of CR tube construction, camera tubes, voltage supplies, saw-tooth generators, sync circuits, control functions, receiving antenna circuits, RF input tuning systems, IF systems, AGC, etc. Fully illustrated; 208 pages; 8½ x 11". Order *TV-1*, only..... $3.00

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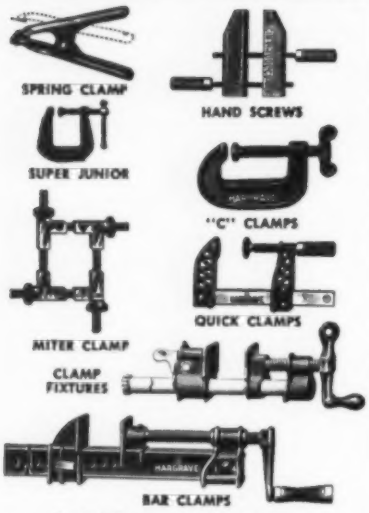


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Dept. IA Dousman, Wisconsin


## SHOP EQUIPMENT NEWS

(Continued from previous page)

the locator holes that reflected inacurrate machine performance.

In the new 9- and 10-in. DeWalt Power Shop models, the steel inserts are pressed into the aluminum yoke casting. Because the steel pin now fits into the harder steel insert metal, it eliminates wear previously experienced.

The new design feature is part of an overall DeWalt product improvement program now under way to give customers better, more accurate, longer lasting radial arm power tools.

There is no increase in the price of the 1958 models because of the addition of these new features. DeWalt dealers are now delivering the new unit to their customers.

**(For further details encircle index code 0404)**

### GASOLINE ENGINE POWERED KALAMOBILE

The Machine Tool Division of the Kalamazoo Tank & Silo Company have introduced the gasoline engine powered Kalamobile — a completely portable horizontal metal cutting band saw for use primarily where power is not readily available.

Gasoline Powered Kalamobile

Combining self power and complete mobility, the popular Model 610D Metal Cutting Band Saw can now be used in all types of field work as the gasoline engine powered Kalamobile or MG610D. The unit is ideally suited for use by railroads, construction companies, telephone field crews, pipeline builders, and maintenance men.

The MG610G is fast, accurate, and a labor saver. It is used for all types of intermittent cutoff work such as pipe, cable, channel, conduit, and angles. The unit is powered by a reliable Continental Red Seal, 2-horsepower gasoline engine for many years of trouble-free operation.

The chassis, with its "wheel-barrow" principle, is rolled about on 12 in. solid rubber tired wheels. Collapsible handles are telescoped into the handle tubes, eliminating objectionable interference when the machine is in operation. The handles are rubber gripped and utilize a halfway stop for an alternate degree of carrying leverage.

The Kalamobile MG610D is the newest in a long line of quality machine tool products manufactured by Kalamazoo Tank & Silo Company. This extensive line includes the models 1220 Metal Cutting Band Saw for unusually large capacity, the versatile Model 8C horizontal cutting saw, the Model 824 for

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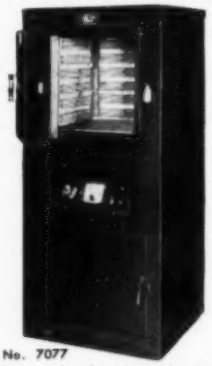
***Hotpack*** **ELECTRIC HEAT TREATING FURNACE**



No. 7077

For Hardening, drawing, tempering and annealing or normalizing of dies, punches, gages, fixtures or other parts are performed readily with these redesigned Hotpack Electric Box Furnaces.

This new Hotpack Electric Furnace is fast heat-built for continuous use from 300° to 2000° F. It is the only Furnace equipped with Automatic Controlling-Indicating Pyrometer and also with Limistat control in this price field.

SPECIFICATIONS

| Model | Interior Size W. D. H. | Current Characteristics | Prices F.O.B. Phila. |
|---|---|---|---|
| 7076 | 8"x 8"x 5½" | 110 V AC 15 Amp. | $265.00 |
| 7074 | 8"x 8"x11" | 115 V AC 15 Amp. | 295.00 |
| 7075 | 12"x12"x11" | 220 V AC 23 Amp. | 430.00 |
| 7077 | 15"x15"x16½" | 200 V AC 30 Amp. | 640.00 |
| 7079 | 12"x12"x 5½" | 110 V AC 15 Amp. | 305.00 |

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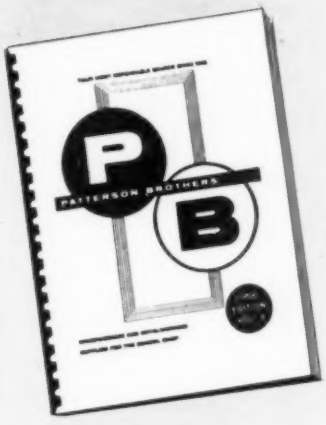


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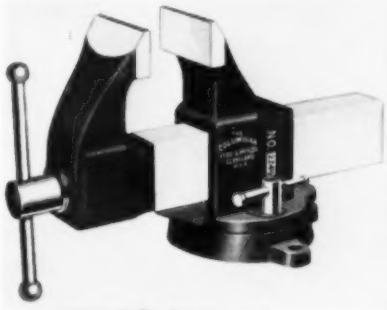
**(For further details encircle index code 0405)**

## IMPROVED SHEET METALWORKERS' VISE

The Columbian Vise & Mfg. Company have announced their improved sheet metalworkers' vise, with malleable iron unbreakable castings.

Designated as Model No. 224½, it is specially designed for auto body work and woodworking, as well as for use with sheet metal.

Malleable iron castings are of the same quality employed for years in Columbian's



Columbian No. 224½ Sheet Metal Workers' Vise

machinists' and combination pipe vises, and the jaw faces are easily replaceable.

The vise has a swivel base which permits it to be swung freely and locked in any desired position. A steel clamping nut operates a forged steel bolt with teeth that mesh into gear-like corrugations in the base plate to form a positive lock. Position of work can be shifted, and it can be held at different angles without removal from vise.

Other features include steel handle balls forged from handle stock and a self-lubricating graphite bronze bearing. This bearing provides easy, positive operation. It also prevents wear and eliminates end play.

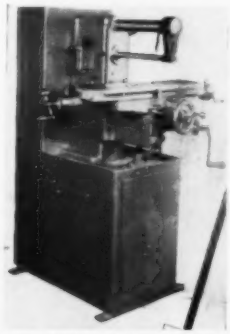
The No. 224½ Columbian Vise has a 4½-in. jaw width and a 9-in. jaw opening. It weighs 60 lb.

Complete data are available. Ask for Bulletin LL-4103.

**(For further details encircle index code 0406)**

## NO. 3PF CROWNINGSHIELD MILLING MACHINE

Brodhead-Garrett Company have announced their new No. 3PF Crowningshield Milling Machine — the *one* machine that offers student instruction in *all* basic milling machine procedures.



No. 3PF Milling Machine

It features (1) hand feed milling to demonstrate the type of production milling students will face immediately after graduation; (2) the advantage of installing lead screw attachment to make it possible to dem-

(Continued on next page)

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— Donald Peters, Supervisor, Industrial Arts and Vocational Education, Arlington County, Virginia.

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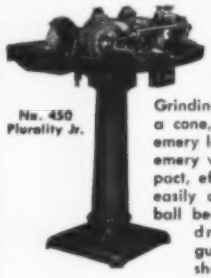

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Grinding can be done on a cone, coarse or fine or emery leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

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*Originators and Pioneer Manufacturers of Oilstone Tool Grinders*

## SHOP EQUIPMENT NEWS

(Continued from previous page)

onstrate and teach tool room milling applications; and (3) how, when vertical head is mounted on the overarm, all normal vertical milling operations may be performed.

The Crowningshield Milling Machine is well designed and produced by a manufacturer with over 50 years of experience in their field.

A Crowningshield Packet, which includes complete specifications and features of this sensational machine, is available.

**(For further details encircle index code 0407)**

### SUPER COBALT HIGH SPEED DRILLS

Chicago-Latrobe are manufacturing Super Cobalt High Speed Drills from special cobalt high speed steels. They are designed for those tough drilling applications where it is not possible to use conventional high speed drills due to red heat, where high speed drills anneal.

Super Cobalt High Speed Drills

Applications for the Super Cobalt Drills would be in work hardened stainless steels, hardened laminated safe steels, silcon chrome and certain chrome nickel alloy steels, armor plate acid-resistant castings and forgings, or similar metals generally considered outside the range of regular drills.

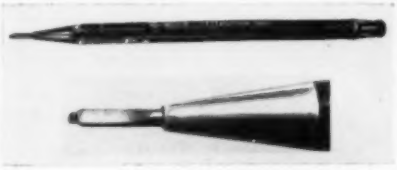
Available in taper shanks in fractional sizes and in jobbers, letter and wire gauge sizes. A bonding bit is made too for drilling rail bond heads.

Folder available on request.

**(For further details encircle index code 0408)**

### CONSTRUCTOR FLAT PROPELLING DRAWING PENCIL

Alvin & Company have introduced a flat drawing pencil that never needs sharpening — the Constructor Flat Propelling Drawing Pencil. It is precision-designed to permit sharp, uniform lines to be drawn at high speed with more even density, which is a new concept for any accurate pencil work for making graphs, charts, plans, and drafting.



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Flat Ribbon Lead Inserts are only .016 thick and .047 wide, an excellent feature for block printing as well as drafting. The form-fitting knurled shaft, made of hard rubber for lightness and durability, makes for easy handling. The newly designed lock-clutch guarantees a nonslip lead grip.

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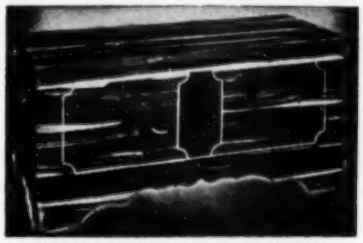

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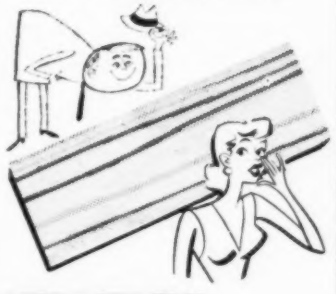

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is stamped and various colored rings are supplied for instant recognition of different grades of lead hardness.

This new Constructor Flat Propelling Drawing Pencil is supplied in a compact attractive box complete with a tube of one dozen leads, available now in an even greater variety of lead degrees.

Further information available.

**(For further details encircle index code 0409)**

### ALCOA EXPANDABLE TUBE-SHEET

Fabricating horizons for aluminum broadened with the announcement that Aluminum Company of America has perfected and greatly amplified a revolutionary process for producing tubular shapes within sheet and plate.

The product of the new manufacturing method has been identified by Alcoa as Expandable Tube-Sheet. It is a unique, one-piece unit of aluminum sheet, or plate, containing a series of lengthwise, parallel areas that can be expanded easily to form integral tubing.

Achieved without complicated joining or fabricating procedures, the product is exceptionally suited to solve heating and cooling problems found in many industrial processes. Liquids or gases can be circulated safely within the leak-proof enclosures to achieve low cost, highly efficient performance in heat-transfer and other types of applications. Vast possibilities will be opened by the new product in the refrigeration, transportation, residential heating, process industry, and air conditioning fields.

One principal outlet for Expandable Tube-Sheet is expected to be in the heat exchanger field. Household refrigerators, air conditioning units, panel heating or cooling for buildings, and air coolers for aircraft engines, offer potential applications for the new product. There are other possibilities for its use in aviation, and for structural uses.

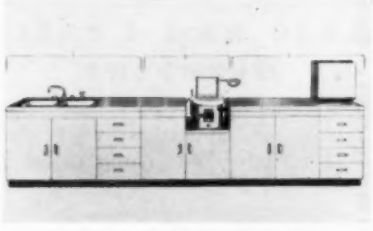
Alcoa now is ready to mass produce Expandable Tube-Sheet utilizing special equipment recently installed at its Alcoa (Tenn.) works.

Additional information available.

**(For further details encircle index code 0410)**

### FUNCTIONAL CERAMICS UNIT

The Tolerton Company have made available a completely functional Ceramics Unit, the Tolerton T-C28, which is designed to fit the floor plan of any crafts class. A variety of arrangements can be made U, L, or continuous.



Functional Ceramics Unit

Over-all dimensions of the unit shown are 12 ft. long, 28 in. deep, and 32 in. high.

All units available with 1¼-in. Tolco maple top or 1¼-in. honey colored plastic. May be purchased as a unit or individual sections.

Further information is available from The Tolerton Company.

**(For further details encircle index code 0411)**

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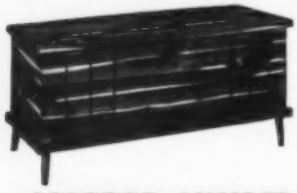

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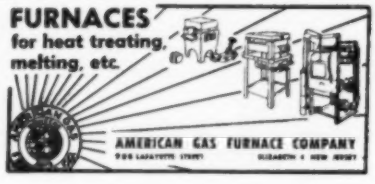

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| Code No. | | Page No. |
|---|---|---|
| 40 | **Adjustable Clamp Company**..... Jorgensen and pony clamps. | 4A |
| 41 | **Alvin & Company**..... Free new ready reference chart with decimal table. | 31A |
| 42 | **Allied Radio Corp., The**..... New dual-speed push-button automatic tape recorder. | 12A |
| 43 | **Alondra Sales, Inc.**..... Instruction on fuel pressure regulation. Use coupon page 43A. | 43A |
| 44 | **Aluminum Co. of America**..... Educational aids. Use coupon page 31A | 31A |
| 45 | **American Gas Furnace Co.**..... Heat treating equipment. | 44A |
| 46 | **American Technical Society**..... Tech books and study guides. Use coupon page 41A for 1957–58 catalog. | 41A |
| 47 | **Armstrong Bros. Tool Co.**..... Metalworking tools and tool holders. | 15A |
| 48 | **Atlas Press Company, The**..... Clausing vertical mill. Write for literature. | 9A |
| 49 | **Bedford Lumber Co.**..... Knockdown cedar chest and aromatic red cedar lumber. | 44A |
| 410 | **Black and Decker Mfg. Co.**..... Valve refacer. Write for information. | 5A |
| 411 | **Board of Examiners**..... Teaching positions. | 44A |
| 412 | **Bradley University** ..... 1958 summer session. | 37A |
| 413 | **Brodhead-Garrett Company** ..... Five new educational kits on basic electricity and electronics. | 21A |
| 414 | **Brown & Sharpe Mfg. Co.**..... Precision tools. | 26A |
| 415 | **Bruce Publishing Company**....3rd cover Graphic arts texts. | |
| 416 | **Bruning Co., Inc., Charles**..... Low cost whiteprinter. Use coupon page 35A for booklet. | 35A |
| 417 | **Camp Robinson Crusoe**..... Camp counsellor position. | 44A |
| 418 | **Can-Pro Corporation** ..... Aprons and coats. | 44A |
| 419 | **Chilton Company** ..... Book on manufacturing methods and processes. | 42A |
| 420 | **Cincinnati Milling Machine Co.**..... Milling machines. | 7A |
| 421 | **Cincinnati Tool Company, The**.... Complete line tested tools. | 40A |
| 422 | **City and Suburban Agency**..... Teacher placement. | 44A |
| 423 | **Constantine & Son, Inc., Albert**..... Woods, tools and materials. | 44A |
| 424 | **Copper Shop, The**..... Copper novelties. | 44A |
| 425 | **Craftsman Wood Service Co.**..... Complete catalog wood & wood-working equipment free to instructors. Use coupon page 27A. | 27A |
| 426 | **Delta Power Tool Div. Rockwell Mfg. Co.** ..... Power tools. Free industrial catalog. | 2A |
| 427 | **Designers Company** ..... Castings for school projects. | 44A |
| 428 | **Diamond Tool & Horseshoe Co.**..... Aviation snips and wrenches. | 14A |
| 429 | **Dietzgen Company, Eugene**...2nd cover Drafting, surveying and printmaking supplies. | |
| 430 | **Disston Division, H. K. Porter Co., Inc.** ..... Electric hand saw. Use coupon page 16A for free copy workshop manual. | 16A |
| 431 | **Eastman Kodak Co.**.....22A & New pageant sound projector. | 23A |
| 432 | **Elbar Products** ..... Tapered drill for carving in plastics. | 44A |
| 433 | **Electric Hotpack Company, Inc.**..... Electric heat treating furnace. | 40A |
| 434 | **EICO** ..... Electrical Kits and instruments. | 32A |
| 435 | **Foley Lumber Company, T. A.**..... Lumber. | 44A |
| 436 | **Ford Industrial Arts Awards**..... Enroll in Industrial Arts Awards Program. Use coupon page 25A. | 25A |
| 437 | **Formit** ..... Tools and materials for making hand wrought iron work. | 33A |
| 438 | **General Finishes Sales & Service Co.** Wood finishing with Sealacell process. | 40A |
| 439 | **Gilbert & Miller, Inc.**..... New catalog for project activities. | 44A |
| 440 | **Giles and Kendall Co.**..... Knockdown cedar chest and aromatic red cedar lumber. | 42A |
| 441 | **Greenlee Tool Co.**..... Auger bits, chisels, gouges. | 12A |
| 442 | **Greenlee Tool Co.**..... Free hollow chisel maintenance folder. | 34A |
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| 444 | **Hammett Company, J. L.**..... Handicraft Supplies. Free catalog. | 44A |
| 445 | **Hardwood Corp. of America**..... Free school shop lumber catalog. | 34A |
| 446 | **Irwin Auger Bit Co.**..... New bit, speedbor 88. Free catalog. | 28A |
| 447 | **Kassel & Co., L. H.**..... Lamp parts and electrical supplies. | 44A |
| 448 | **Kester Solder Company**..... Flux core solder. | 32A |


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**INDUSTRIAL ARTS AND VOCATIONAL EDUCATION** — **April, 1958**
**400 North Broadway, Milwaukee 1, Wisconsin**

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| ADVERTISING INDEX | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 46 | 412 | 418 | 424 | 430 | 436 | 442 | 448 | 454 | 460 | 466 | 472 | 478 | 484 | 490 | | | | | | | | | | | |
| 41 | 47 | 413 | 419 | 425 | 431 | 437 | 443 | 449 | 455 | 461 | 467 | 473 | 479 | 485 | 491 | | | | | | | | | | | |
| 42 | 48 | 414 | 420 | 426 | 432 | 438 | 444 | 450 | 456 | 462 | 468 | 474 | 480 | 486 | 492 | | | | | | | | | | | |
| 43 | 49 | 415 | 421 | 427 | 433 | 439 | 445 | 451 | 457 | 463 | 469 | 475 | 481 | 487 | 493 | | | | | | | | | | | |
| 44 | 410 | 416 | 422 | 428 | 434 | 440 | 446 | 452 | 458 | 464 | 470 | 476 | 482 | 488 | 494 | | | | | | | | | | | |
| 45 | 411 | 417 | 423 | 429 | 435 | 441 | 447 | 453 | 459 | 465 | 471 | 477 | 483 | 489 | 495 | | | | | | | | | | | |
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| ADVERTISING INDEX | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 46 | 412 | 418 | 424 | 430 | 436 | 442 | 448 | 454 | 460 | 466 | 472 | 478 | 484 | 490 | | | | | | | | | | | |
| 41 | 47 | 413 | 419 | 425 | 431 | 437 | 443 | 449 | 455 | 461 | 467 | 473 | 479 | 485 | 491 | | | | | | | | | | | |
| 42 | 48 | 414 | 420 | 426 | 432 | 438 | 444 | 450 | 456 | 462 | 468 | 474 | 480 | 486 | 492 | | | | | | | | | | | |
| 43 | 49 | 415 | 421 | 427 | 433 | 439 | 445 | 451 | 457 | 463 | 469 | 475 | 481 | 487 | 493 | | | | | | | | | | | |
| 44 | 410 | 416 | 422 | 428 | 434 | 440 | 446 | 452 | 458 | 464 | 470 | 476 | 482 | 488 | 494 | | | | | | | | | | | |
| 45 | 411 | 417 | 423 | 429 | 435 | 441 | 447 | 453 | 459 | 465 | 471 | 477 | 483 | 489 | 495 | | | | | | | | | | | |
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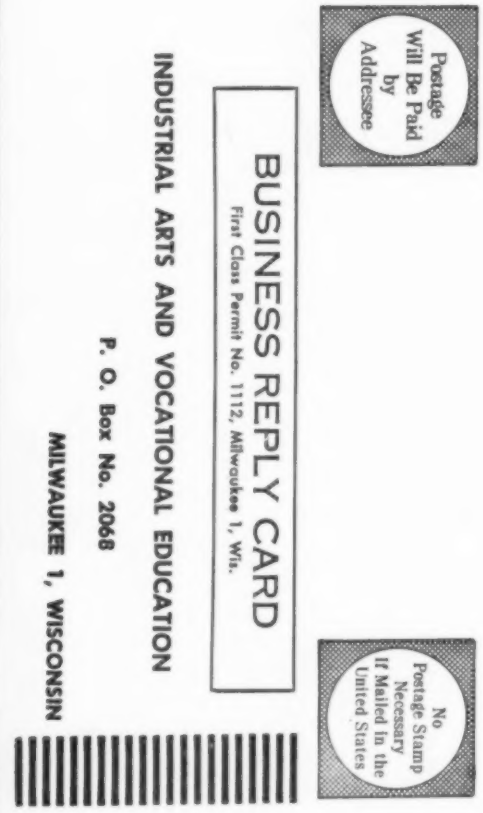
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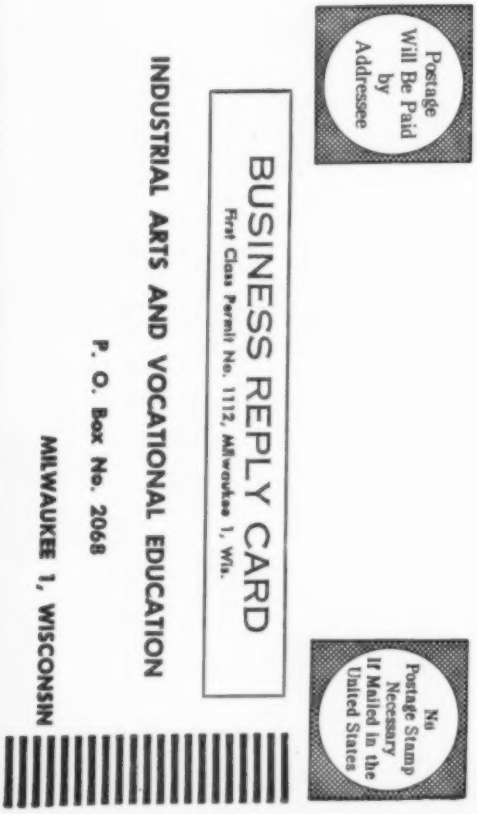
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(Continued)

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| 449 | **Larson Co., J. C.** Big illustrated leathercraft catalog. | 43A |
| 450 | **LeBlond Machine Tool Co., R. K.** Complete line of lathes. | 4th cover |
| 451 | **Logan Engineering Company** Lathes. Catalog on request. | 10A |
| 452 | **Mayline Co.** Art and drafting table. | 27A |
| 453 | **McKnight and McKnight** Free catalog classroom tried and tested shop books. Use coupon page 33A. | 33A |
| 454 | **Millers Falls Company** Dyno-mite power workshop. | 6A |
| 455 | **Mittermeier, Frank** Imported carving tools and hobbycraft sets. | 44A |
| 456 | **Modern School Supplies** Drafting supplies. Free catalog. | 44A |
| 457 | **Morgan Vise Company** Vises. | 42A |
| 458 | **Mummert-Dixon Company** Oilstone tool grinders. | 42A |
| 459 | **New York University** 1958 summer session. | 33A |
| 460 | **Oliver Machinery Co.** Heavy type 8 inch jointer. | 16A |
| 461 | **O'Neil Irwin Mfg. Company** New spartan model 24 di-acro box and pan brake. Use coupon 30A for information. | 30A |
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| 462 | **Oswego State Teachers College** 1958 summer session. | 38A |
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| 0402 | **Millers Falls Co.** No. 777 Impact Wrench | 38A |
| 0403 | **General Scientific Equipment Co.** Space-Saving First Aid Station | 39A |
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| 0406 | **Columbian Vise & Mfg. Co.** Improved Sheet Metalworkers' Vise | 41A |
| 0407 | **Brodhead-Garrett Co.** No. 3PF Crowningshield Milling Machine | 41A |
| 0408 | **Chicago-Latrobe** Super Cobalt High Speed Drills | 42A |
| 0409 | **Alvin & Co.** Constructor Flat Propelling Drawing Pencil | 42A |
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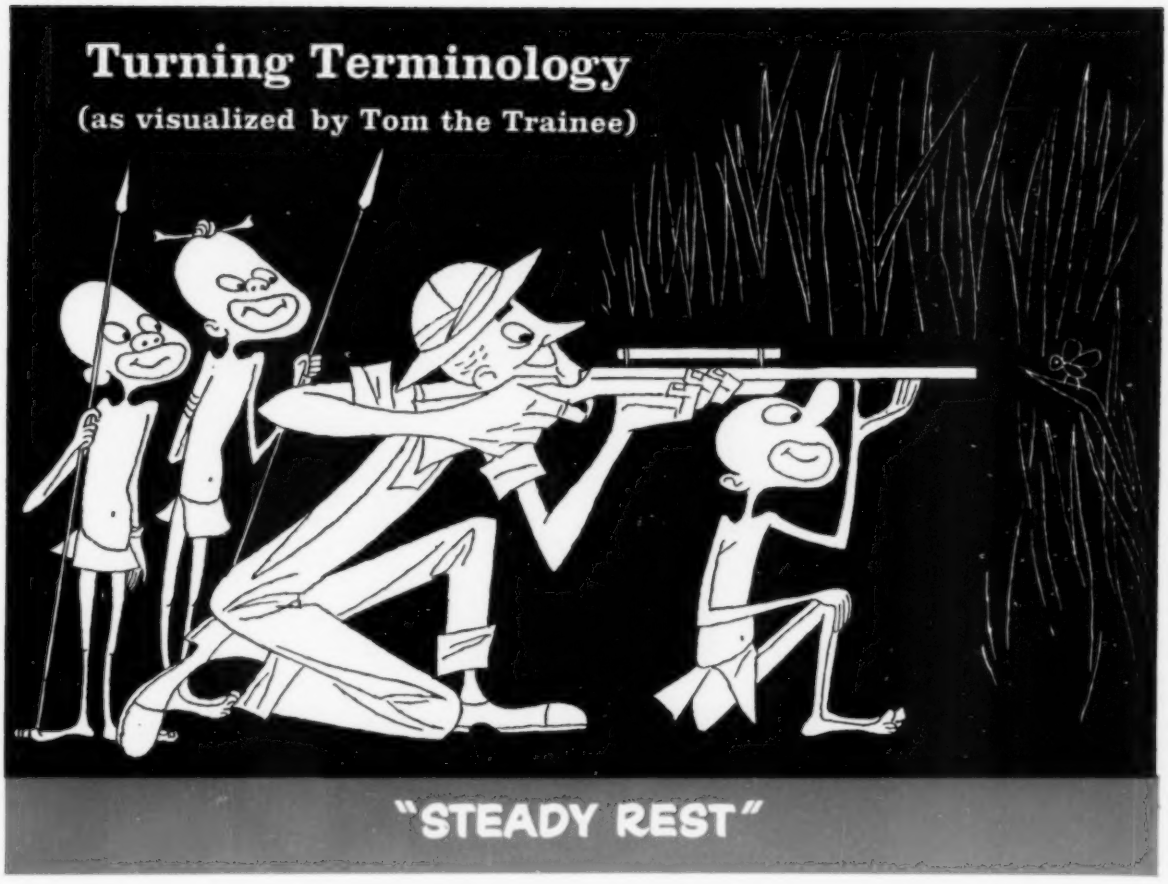


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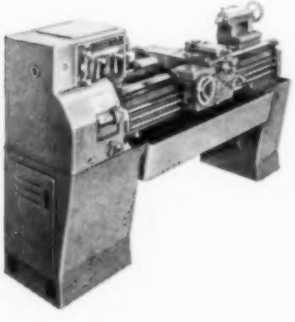

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